Vol. 1085 Number 5

OFFICIAL GAZETTE

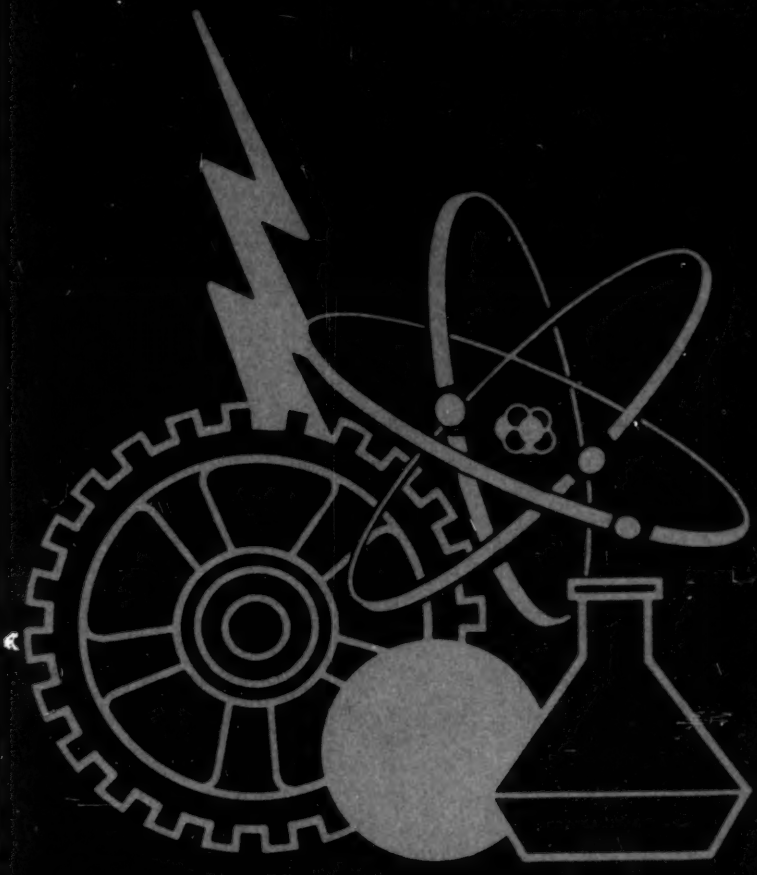
of the

UNITED STATES PATENT AND TRADEMARK OFFICE

oute to:

PATENTS

December 29, 1987



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OFFICIAL GAZETTE of the
UNITED STATES PATENT AND TRADEMARK OFFICE
December 29, 1987 Volume 1085 Number 5

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The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed:

THE OFFICIAL GAZETTE (PATENT SECTION), issued weekly.
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Printing authorized by Section 11(a)3 of Title 35, U.S. Code P.T.O.

195-976 O.G.-87-1

PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1076 O.G. 3 on Mar. 3, 1987.

For use of the European Patent Office as a Searching Authority for PCT applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

For use of the European Patent Office as a Preliminary Examining Authority for PCT applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987.

Certain domestic PCT fees for international applications have been changed effective Oct. 5, 1985 in the rule change notice titled "Revision of Patent Fees" published at 1057 O.G. 24 on Aug. 20, 1985.

The Search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar with regard to the German Mark as of Apr. 1, 1987, and was announced in the *Official Gazette* at 1077 O.G. 3 on Apr. 7, 1987.

Domestic PCT Fees for Chapter II, effective July 1, 1987, were announced in the *Official Gazette* at 1079 O.G. 32 on June 16, 1987.

International PCT fees were changed on July 1, 1987 due to a difference in the exchange rate of the U.S. dollar with regard to the Swiss Franc and were announced in the *Official Gazette* at 1079 O.G. 50 on June 23, 1987.

International PCT Chapter II fees which were effective July 1, 1987, were announced in the *Official Gazette* at 1079 O.G. 50 on June 23, 1987. The elimination of multiple handling fees and the supplement to the handling fee under PCT Rule 57 was announced at 1085 O.G. 34 on Dec. 22, 1987.

The withdrawal of the Japanese declaration under PCT Article 64(2)(a), concerning the requirement for a Japanese translation of the international application within 20 months from the priority date where Japan is elected uner PCT Chapter II, as from Dec. 8, 1987, was announced at 1085 O.G. 34 on Dec. 22, 1987.

National stage fees effective July 1, 1987, for entering the U.S. Patent and Trademark Office as a designated or elected Office were changed effective July 1, 1987, and were announced in the *Official Gazette* at 1079 O.G. 32 on June 16, 1987.

The current schedule of PCT fees is as follows:

Transmittal fee:	170.00
Search Fee	
U.S. Patent and Trademark Office as Searching Authority (ISA)	
—No corresponding prior U.S. national application filed:	520.00
—Corresponding prior U.S. national application filed:	350.00
—Supplemental search fee, per additional invention	140.00
European Patent Office as Searching Authority	1180.00
Preliminary examination fee	
U.S. Patent and Trademark Office as Preliminary Examining Authority (IPEA)	
—Search fee paid to USPTO as Searching Authority	370.00
—Additional examination fee, per additional invention	125.00
—Searching Authority not the USPTO	570.00
—Additional examination fee, per additional invention	190.00
International fees	
Basic fee:	485.00
Basic Supplemental fee (for each page over 30):	10.00
Designation fee for the first 10 national or regional offices:	120.00
Designation fee for 11th and subsequent designations:	No Charge
Handling fee:	150.00

U.S. National Stage fees

	Small Entity	Non-small Entity
U.S. Patent and Trademark Office was Preliminary Examining Authority (IPEA)	150.00	300.00
USPTO was ISA but not IPEA	170.00	340.00
USPTO was neither ISA nor IPEA	225.00	450.00
USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(1) to (4)	25.00	50.00
—For each independent claim in excess of 3	17.00	34.00
—For each claim in excess of 20	6.00	12.00
—For each application containing a multiple dependent claim	55.00	110.00
—Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39.1	55.00	110.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39.1	26.00	26.00

Nov. 17, 1987.

DONALD J. QUIGG,
Assistant Secretary and Commissioner of Patents and Trademarks.

Status of Appeal Cases

The Date of Examiner's Answer of Oldest Ex Parte Appeals Awaiting Assignment to Panel For A Decision Without a Hearing as of Nov. 30, 1987.

Chemical Discipline	–	Jan. 22, 1987
Mechanical Discipline	–	June 13, 1985
Electrical Discipline	–	Mar. 27, 1986

The Date of Examiner's Answer of Oldest Ex Parte Appeals Awaiting Hearing as of Nov. 30, 1987.

Chemical	–	July 19, 1985
Electrical	–	May 2, 1985
Mechanical	–	June 2, 1985

Board of Patent Appeals and Interferences Decisions Rendered in Ex Parte Appeals During the Month of Nov. 1987.

Affirmed	225
Affirmed-in-Part	36
Reversed	141
Total Decided	402

Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on applications filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Oct. 5, 1985. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the grant.

Attention is drawn to the patents which were issued on December 25, 1984, for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,489,443 through 4,490,854
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months are set forth in 37 CFR 1.20(e) and (h), as amended effective Oct. 5, 1985, which are reproduced below:

37 CFR §1.20 Post-issuance fees

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant . . . $ 225.00"

"(h) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f)) . . . . . $ 225.00
By other than a small entity . . . . . $ 450.00"

The amounts of the surcharges as amended effective Oct. 5, 1985, are set forth in 37 CFR 1.20 (k) and (l) which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982 . . . . . $ 110.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity (§1.9(f)) . . . . . $ 55.00
By other than a small entity . . . . . $ 110.00"

Section 1.20 paragraph (m) as amended as a result of enactment of Public Law 98–622 effective Nov. 8, 1984, is reproduced below:

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay in payment is shown to the satisfaction of the Commissioner to have been unavoidable . . . . . $ 500.00"

Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

PATENTS WHICH EXPIRED JULY 12, 1987, DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
4,408,362	06/394,705	10/11/83
4,408,363	06/255,458	10/11/83
4,408,364	06/359,942	10/11/83
4,408,368	06/282,968	10/11/83
4,408,371	06/295,731	10/11/83
4,408,378	06/265,813	10/11/83
4,408,381	06/284,967	10/11/83
4,408,391	06/233,983	10/11/83
4,408,403	06/289,171	10/11/83
4,408,405	06/250,471	10/11/83
4,408,406	06/303,919	10/11/83
4,408,408	06/282,095	10/11/83
4,408,411	06/265,727	10/11/83
4,408,412	06/284,608	10/11/83
4,408,414	06/369,633	10/11/83
4,408,421	06/259,483	10/11/83
4,408,425	06/291,792	10/11/83
4,408,426	06/289,277	10/11/83
4,408,429	06/310,434	10/11/83
4,408,434	06/223,061	10/11/83
4,408,436	06/266,511	10/11/83
4,408,441	06/343,212	10/11/83
4,408,486	06/349,378	10/11/83
4,408,469	06/328,152	10/11/83
4,408,473	06/319,684	10/11/83
4,408,475	06/230,335	10/11/83
4,408,477	06/406,529	10/11/83
4,408,488	06/365,845	10/11/83
4,408,501	06/265,746	10/11/83
4,408,506	06/253,706	10/11/83
4,408,509	06/325,390	10/11/83
4,408,513	06/360,181	10/11/83
4,408,515	06/282,545	10/11/83
4,408,533	06/286,820	10/11/83
4,408,537	06/283,333	10/11/83
4,408,546	06/224,488	10/11/83
4,408,549	06/267,883	10/11/83
4,408,550	06/328,202	10/11/83
4,408,555	06/274,365	10/11/83
4,408,556	06/230,993	10/11/83

Patent Number	Serial Number	Issue Date
4,408,567	06/231,059	10/11/83
4,408,571	06/388,839	10/11/83
4,408,573	06/310,208	10/11/83
4,408,575	06/278,511	10/11/83
4,408,586	06/274,188	10/11/83
4,408,587	06/236,384	10/11/83
4,408,601	06/251,872	10/11/83
4,408,615	06/239,469	10/11/83
4,408,623	06/277,966	10/11/83
4,408,633	06/249,501	10/11/83
4,408,635	06/317,185	10/11/83
4,408,639	06/220,235	10/11/83
4,408,646	06/317,559	10/11/83
4,408,653	06/319,515	10/11/83
4,408,656	06/299,296	10/11/83
4,408,666	06/315,744	10/11/83
4,408,670	06/257,366	10/11/83
4,408,679	06/306,190	10/11/83
4,408,680	06/241,250	10/11/83
4,408,682	06/272,182	10/11/83
4,408,688	06/320,686	10/11/83
4,408,693	06/306,504	10/11/83
4,408,696	06/261,492	10/11/83
4,408,716	06/353,407	10/11/83
4,408,719	06/274,411	10/11/83
4,408,737	06/280,280	10/11/83
4,408,738	06/303,788	10/11/83
4,408,757	06/343,686	10/11/83
4,408,761	06/298,733	10/11/83
4,408,762	06/273,246	10/11/83
4,408,763	06/350,617	10/11/83
4,408,764	06/236,257	10/11/83
4,408,768	06/327,608	10/11/83
4,408,774	06/264,060	10/11/83
4,408,779	06/237,087	10/11/83
4,408,785	06/277,041	10/11/83
4,408,792	06/245,397	10/11/83
4,408,799	06/277,416	10/11/83
4,408,805	06/268,006	10/11/83
4,408,829	06/229,823	10/11/83
4,408,830	06/239,717	10/11/83
4,408,846	06/230,905	10/11/83
4,408,849	06/443,431	10/11/83
4,408,886	06/349,491	10/11/83
4,408,899	06/285,799	10/11/83
4,408,906	06/329,833	10/11/83
4,408,912	06/219,904	10/11/83
4,408,923	06/241,928	10/11/83
4,408,928	06/245,900	10/11/83
4,408,940	06/300,011	10/11/83
4,408,949	06/407,125	10/11/83
4,408,950	06/379,168	10/11/83
4,408,956	06/325,545	10/11/83
4,408,958	06/219,467	10/11/83
4,408,967	06/238,287	10/11/83
4,408,973	06/378,070	10/11/83
4,408,974	06/340,865	10/11/83
4,408,987	06/340,977	10/11/83
4,408,988	06/416,484	10/11/83
4,408,990	06/372,080	10/11/83
4,408,992	06/381,319	10/11/83
4,408,993	06/350,984	10/11/83
4,408,996	06/310,416	10/11/83
4,408,997	06/316,704	10/11/83
4,409,001	06/338,197	10/11/83
4,409,021	06/375,492	10/11/83
4,409,036	06/219,574	10/11/83
4,409,052	06/257,407	10/11/83
4,409,075	06/283,374	10/11/83
4,409,081	06/346,263	10/11/83
4,409,096	06/273,521	10/11/83
4,409,104	06/249,164	10/11/83
4,409,105	06/323,338	10/11/83
4,409,112	06/333,968	10/11/83
4,409,121	06/392,869	10/11/83
4,409,137	06/247,446	10/11/83
4,409,161	06/321,152	10/11/83
4,409,166	06/250,233	10/11/83
4,409,174	06/334,099	10/11/83
4,409,184	06/348,746	10/11/83
4,409,198	06/405,009	10/11/83
4,409,207	06/262,119	10/11/83
4,409,211	06/356,531	10/11/83
4,409,220	06/297,024	10/11/83
4,409,224	06/282,575	10/11/83
4,409,225	06/243,762	10/11/83
4,409,234	06/384,861	10/11/83
4,409,247	06/269,945	10/11/83
4,409,269	06/357,384	10/11/83
4,409,306	06/355,018	10/11/83
4,409,372	06/340,914	10/11/83
4,409,375	06/347,965	10/11/83
4,409,400	06/370,393	10/11/83
4,409,419	06/290,655	10/11/83
4,409,421	06/385,225	10/11/83
4,409,428	06/382,596	10/11/83
4,409,429	06/389,683	10/11/83
4,404,439	06/257,362	10/11/83
4,409,468	06/317,147	10/11/83
4,409,482	06/251,863	10/11/83
4,409,485	06/308,740	10/11/83
4,409,487	06/267,562	10/11/83
4,409,490	06/288,766	10/11/83
4,409,491	06/453,619	10/11/83
4,409,510	06/434,355	10/11/83
4,409,513	06/308,841	10/11/83
4,409,516	06/227,224	10/11/83
4,409,544	06/256,782	10/11/83
4,409,545	06/233,426	10/11/83
4,409,549	06/226,638	10/11/83
4,409,550	06/264,100	10/11/83
4,409,587	06/343,031	10/11/83
4,409,588	06/242,347	10/11/83
4,409,590	06/305,867	10/11/83
4,409,591	06/265,371	10/11/83
4,409,608	06/258,345	10/11/83
4,409,612	06/303,308	10/11/83
4,409,637	06/441,765	10/11/83
4,409,641	06/262,914	10/11/83
4,409,644	06/272,987	10/11/83
4,409,646	06/224,798	10/11/83
4,409,647	06/243,125	10/11/83
4,409,684	06/289,102	10/11/83

Notification of Acceptance of Delayed Payment of Maintenance Fee
(35 U.S.C. 41(c); 37 CFR 1.378)

The patents listed below are considered as not having expired but are subject to the conditions set forth in 35 U.S.C. 41(c)(2), in view of the Petition to Accept Late Payment of the maintenace fees which has been GRANTED BY THE COMMISSIONER OF PATENTS AND TRADEMARKS, as provided for under 35 U.S.C. 4 1(c)(1) and 37 CFR 1.378.

Patent No.	Serial No.	Patent Date	Application Filing Date	Delayed Payment Acceptance Date
4,370,355	06/291,866	1/25/83	8/10/81	11/10/87
4,396,451	06/329,353	8/02/83	12/09/81	11/23/87

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.19(a)).

4,044,805, Re. S.N. 117,324, Filed Nov. 6, 1987, Cl. 144/134D, ROUTER GUIDE UNIT, Donald D. Gronholz, Owner of Record: *Marlene J. Gronholz, Bloomington, Minn.,* Attorney or Agent: Richard O. Bartz, Ex. Gp.: 321

4,223,396, Re. S.N. 116,260, Filed Nov. 3, 1987, Cl. 365/194, DELAYED LINE FOR SENSE AMPLIFIER PULSE, Hiroyuki Kinoshita, Owner of Record: *Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan,* Attorney or Agent: Donald W. Banner, et al., Ex. Gp.: 233

4,234,101, Re. S.N. 117,611, Filed Nov. 6, 1987, Cl. 221/241, CUP DISPENSER EMPLOYING UNIVERSAL ADJUSTMENT APPARATUS, Ronald Patore, Owner of Record: *James River Norwalk, Inc., Norwalk, Conn.,* Attorney or Agent: Douglas E. Henderson, et al., Ex. Gp.: 311

4,487,801, Re. S.N. 117,804, Filed Nov. 6, 1987, Cl. 428/313.5, FRAGRANCE-RELEASING PULL-APART SHEET, Everett M. Turnbull, et al., Owner of Record: *Minnesota Mining and Manufacturing Co., St. Paul, Minn.,* Attorney or Agent: Donald M. Sell, et al., Ex. Gp.: 154

4,538,811, Re. S.N. 099,163, Filed Aug. 25, 1987, Cl. 273/31, ARBITRATION OF TENNIS BY CHANGE OF COLORS, Luis T. Wigoda, Owner of Record: *Inventor,* Attorney or Agent: Harry W. Barron, Ex. Gp.: 334

4,540,568, Re. S.N. 116,579, Filed Aug. 24, 1987, Cl. 424/81, INJECTIONABLE VISCOELASTIC OPHTHALMIC GEL, Seymour F. Trager, et al., Owner of Record: *Inventor,* Attorney or Agent: Harold C. Wegner, et al., Ex. Gp.: 125

4,542,811, Re. S.N. 098,041, Filed Sept. 17, 1987, Cl. 188/322.17, SHOCK ABSORBER, Takeshi Miura, Owner of Record: *Nok Corp., Tokyo, Japan,* Attorney or Agent: Owen E. Perry, Ex. Gp.: 314

4,582,199, Re. S.N. 117,192, Filed Nov. 4, 1987, Cl. 206/428, CARTON AND BLANK THEREFOR, Richard L. Schuster, Owner of Record: *Manville Sales Corp., Ken-Caryl Ranch, Colo.,* Attorney or Agent: Ernie L. Brooks, et al., Ex. Gp.: 241

4,652,695, Re. S.N. 095,874, Filed Sept. 14, 1987, Cl. 174/035.OGC, MESH-COVERED CORE STRIP FOR HIGH FREQUENCY RFI/EMI RADIATION SHIELDING, Robert B. Busby, Owner of Record: *Pawling Corp., Pawling, N.Y.,* Attorney or Agent: Fritz Z. Schweitzer, Jr., Ex. Gp.: 215

4,663,719, Re. S.N. 117,053, Filed Nov. 5, 1987, Cl. 364/444, METHOD AND APPARATUS FOR DISPLAY OF DISTANCE AND DIRECTION TO DESTINATION, Muneaki Matsumoto, et al., Owner of Record: *Nippon Soken, Inc., Aichi-Ken, Japan,* Attorney or Agent: Paul N. Kokulis, et al., Ex. Gp.: 234

4,669,622, Re. S.N. 117,975, Filed Nov. 9, 1987, Cl. 215/237, PLASTIC ENCLOSURE FOR CONTAINER EMPLOYING THREE LIVING HINGES, Robert H. Bennett, Owner of Record: *Anchor Hocking Corp., Lancaster, Ohio,* Attorney or Agent: Alexander C. Wilkie, Jr., Ex. Gp.: 241

REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b)).

4,052,353 Reexam. No. 09/001,380, Requested: Nov. 18, 1987, Cl. 524/801, DISPERSIONS OF WATER SOLUBLE POLYMERS IN OIL, Clyde S. Scanley, Owner of Record: *Inventor, Morristown, N.J.,* Attorney or Agent: Unknown, Ex. Gp.: 150, Requester: Owner

4,194,650, Reexam. No. 90/001,377, Requested: Nov. 16, 1987, Cl. 222/57, LIQUID MIXING AND AERATING SYSTEM, James Nottke, et al., Owner of Record: *Lykes Pasco Packing Co., Dispenser Mftg Div., Clearwater, Fla.,* Attorney or Agent: Frijouf, Rust, et al., Ex. Gp.: 310, Requester: Lancer Corp., San Antonio, Tex.

4,338,199, Reexam. No. 90/001,378, Requested: Nov. 16, 1987, Cl. 210/721, PROCESSING METHODS FOR THE OXIDATION OF ORGANICS IN SUPERCRITICAL WATER, Michael Modell, Owner of Record: *Modar Inc., Houston, Tex.,* Attorney or Agent: Lester L. Hewitt, Ex. Gp.: 130, Requester: Owner

4,575,312, Reexam. No. 90/001,382, Requested: Nov. 20, 1987, Cl. 416/179, IMPELLER, Magnus Erikson, Owner of Record: *ITT Industries, Inc., New York, N.Y.,* Attorney or Agent: John T. O'Halloran, Ex. Gp.: 341, Requester: Unknown

4,601,783, Reexam. No. 90/001,381, Requested: Nov. 20, 1987, Cl. 156/655, HIGH CONCENTRATION SODIUM PERMANGANATE ETCH BATH AND ITS USE IN DESMEARING AND/OR ETCHING PRINTED CIRCUIT BOARD, Gerald Krulik, Owner of Record: *Morton Thiokol Inc., Chicago, Ill.,* Attorney or Agent: Richard Sheridan, Ex. Gp.: 130, Requester: Owner

4,603,149, Reexam. No. 90/001,376, Requested: Nov. 10, 1987, Cl. 521/57, ANTI-STATIC STYRENE POLYMER PARTICLES BY COATING, Haven S. Kesling, et al., Owner of Record: *Arco Chemical Co., Newtown Square, Pa.,* Attorney or Agent: John C. Martin, Ex. Gp.: 150, Requester: Owner

4,624,068, Reexam. No. 90/001,379, Requested: Nov. 18, 1987, Cl. 43/6, SPEARPOINT ASSEMBLY, Harland V. Howard, III, Owner of Record: *Panama Breakaway Inc., Bethel Park, Pa.,* Attorney or Agent: Warren E. Olsen, Ex. Gp.: 320, Requester: The A. B. Biller Co., Bloomingdale, Ill.

Department of the Treasury
United States Customs Service
(T.D. 87-138)

Recordation of Trade Name: "BROWNING"

Agency: U.S. Customs Service, Department of the Treasury
Action: Notice of Recordation
Summary: On Aug. 3, 1987, a notice of application for the recordation under section 42 of the Act of July 5, 1946, as amended (15 U.S.C. 1124), of the trade name "BROWNING" was published in the Federal Register (52 FR 28773). The notice advised that before final action was taken on the application, consideration would

be given to any relevant data, views, or arguments submitted in writing by any person in opposition to the recordation and received not later than Oct. 2, 1987. No responses were received in opposition to the notice.

Accordingly, as provided in section 133.14, Customs Regulations (19 CFR 133.14), the name "BROWNING" is recorded as the trade name used by Browning, a corporation organized under the laws of the State of Utah, located at Rte. 1, Morgan, Utah 84050. The trade name is used in connection with the following merchandise manufactured in Belgium, France, England, Italy, West Germany, Portugal and Canada: hunting, camping and sporting goods equipment and accessories and sportswear including shotguns, rifles, black powder rifles, pistols, pistol cases, pistol holsters, flexible gun cases, fitted luggage cases, recoil pads, sight beads, chokes for shotguns, scope mount rings and bases, rifle slings and swivels, magazine plugs, gun oil, gun cleaners, gun safes, pocket knives, knife sharpeners, fishing and hunting knives, knife sheaths, knife honing oil, sleeping bags, coats, jackets, parkas, vests, insulated hunting suits, hoods, rain jackets, rain coats, rain pants, rain suits, rain parkas, underwear, hunting trousers, hunting vests, gloves, mittens, shooting gloves, hats, shirts, belts, belt buckles, insulated boots, waterproof boots, boot laces, boot dressings, socks, wool fleece bedding, archery bows, cross bows, archery gloves, shooting tabs, arm guards, quivers, nontelescopic bow sights and slings, bow cases, target faces, bow strings, fishing rods, rod blanks and cases, hand-pulled golf carts, golf clubs, golf bags and golf club head covers.

Date: Nov. 16, 1987.

For Further Information Contact: Beatrice E. Moore, Entry, Licensing and Restricted Merchandise Branch, 1301 Constitution Ave., NW., Washington, D.C. 20229 (202-566-5764).

Nov. 5, 1987.

JERRY C. LADERBERG,
Acting Chief, Entry,
Licensing and Restricted
Merchandise Branch .

Department of the Treasury
United States Customs Service
(T.D. 87-136)

Recordation of Trade Name : "TWO'S COMPANY"

Agency: U.S. Customs Service, Department of the Treasury

Action: Notice of Recordation

Summary: On Aug. 3, 1987, a notice of application for the recordation under section 42 of the Act of July 5, 1946, as amended (15 U.S.C. 1124), of the trade name "TWO'S COMPANY" was published in the Federal Register (52 FR 28774). The notice advised that before final action was taken on the application, consideration would be given to any relevant data, views, or arguments submitted in writing by any person in opposition to the recordation and received not later than Oct. 3, 1987. No responses were received in opposition to the notice.

Accordingly, as provided in section 133.14, Customs Regulations (19 CFR 133.14), the name "TWO'S COMPANY" is recorded as the trade name used by Two's Company, a corporation organized under the laws of the State of New York, located at 33 Bertel Ave., Mount Vernon, N.Y. 10550. The trade name is used in connection with the following merchandise manufactured in Japan, Hong Kong and Taiwan: acrylic and glass vases; stirrers; glass picture frames; glass products; floral accessories; commerical flowers containers; Christmas ornaments; silver and silver plated products; napkin rings and vinyl products.

Date: Nov. 9, 1987.

For Further Information Contact: Harriet Lane, Entry, Licensing and Restricted Merchandise Branch, 1301 Constitution Ave., NW., Washington, D.C. 20229 (202-566-5765).

Nov. 3, 1987.

JERRY C. LADERBERG,
Acting Chief, Entry
Licensing and Restricted
Merchandise Branch.

Survey of Registered Practitioners in Patent Cases

Pursuant to 37 CFR 10.11(b), a survey letter was mailed on Nov. 20, 1987 from the Office of Enrollment and Discipline (OED) to all practitioners in patent cases whose last names begin with *E through J*. Enclosed with the letter is a data sheet which must be completed and returned to OED as soon as possible. All data sheets returned to OED will be acknowledged. Failure by a practitioner to submit a completed data sheet within the time period specified in the survey letter will result in the practitioner being removed from the register in accordance with 37 CFR 10.11(b).

If your last name begins with *E through J* and you have not received a data sheet or if you returned the data sheet to OED and you did not receive an acknowledgement within (3) months after returning the data sheet to OED, please contact Patricia M. Jordan at (703) 557-1728.

Dec. 1, 1987.

CAMERON WEIFFENBACH,
Director, Office of
Enrollment & Discipline.

Service by Publication

A petition to cancel each of the registrations identified below having been filed, and the notice of such proceedings sent by registered mail to each registrant at the last known address having been returned by the Postal Service as undeliverable, notice is hereby given that unless the registrants listed herein, their assigns or legal representatives, shall enter an appearance within thirty days from the date of this publication, the cancellation will be proceeded with as in the case of default.

Patricia S. Abraham, Mandeville, La., Reg. No. 1,402,736, for the mark "ACAPULCO SOL RICH TANNING CREME and Design", Canc. No. 16,362.

ERMA S. BROWN,
Administrator
of the Trademark Trial
and Appeal Board.
For JEFFREY M. S^MUELS,
Assistant Commissioner
for Trademarks.

Advisory Committee for Patents and Trademarks

Notice of Open Meeting

In accordance with Section 10(a)(2) of the Federal Advisory Committee Act (Public Law 92-463), announcement is made of the following Committee Meeting:

The Advisory Committee for Patents and Trademarks will meet from 9:00 a.m. to 4:30 p.m. on Jan. 8, 1988, at the U.S. Patent and Trademark Office in Crystal City, Arlington, Va. The meeting will be held in the Commissioner's Conference Room.

The agenda for the meeting follows:

(1) Orientation
(2) Automation Activities

(3) Quality Products
(4) Innovation Promotion

The meeting will be open to public observation; approximately 12 seats will be available for the public on a first-come, first-served basis. If time permits, oral comments by the public of no more than three minutes on each topic within the above agenda will be allowed. Written comments and suggestions will be accepted before or after the meeting on any of the agenda matters.

For exact meeting location and other information, contact Donald G. Kelly, Executive Assistant to the Assistant Secretary, Patent and Trademark Office, Crystal Plaza 3, Room 11E10, Washington, D.C. 20231. Telephone: 703/557-3071.

Dec. 4, 1987.

DONALD J. QUIGG,
Assistant Secretary and
Commissioner of Patents
and Trademarks.

Status of PTO Services

The following is an update of the status of PTO services for November 1987:

Service Item	FY 1987 Goal (Calendar Days*)	Monthly Average (Calendar Days*)
Filing Receipts:		
Patents	22	25
Trademarks	30	45**
Patent/Trademark Copies:		
Special Window Coupons	24 Hours	19 Hours
Window Coupons	5	3
Mail Coupons	12	8
Letter Orders	16	13
Certified Copies:		
Trademark Registrations	21	21
Applications-As-Filed	17	18***
File-Wrapper/Contents	N/A	28
Walk-up Certification	1	2
Trademark Search Library:		
Filing Pending Marks	21	34
Filing Reg. Certificates	Issue Date	Issue Date
Assignments:		
Recording Patent Assignments	20	40 ****
Receipt Date of Patent Documents Returned		Oct. 20, 1987
Recording Trademark Assignments	20	20
Receipt Date of Trademark Documents Returned		Nov. 6, 1987
Avg. Days from Issue Fee Payment to Issue Date	90–100	88
Issue Fee Receipts Mailed	4 weeks prior to Issue Date	On schedule
Patent Copies Available	95% on Issue Date	92% on Issue Date*****
Trademark Copies Available	95% on Issue Date	99% on Issue Date

* Unless otherwise noted.
** Monthly average reduced by 19 days since last month.
*** The 5% of orders for which fiche are not on site are not included in calculations.
**** While reducing monthly average processing time by 6 days, continual staff recruiting problems have prevented us from getting back to goal levels.
***** Printer delivered copies late.

IMPROVEMENTS TO SERVICES

- *Special Mail Boxes* — As suggested by a patent attorney, special mail boxes are now being published regularly in each Official Gazette.

- *New Equipment* — The Office has upgraded two reader/printers located in the Trademark Archive Room (CP2-3 C24). The old 3M "500" reader/printers have been replaced with new plain paper Minolta "505" reader/printers. These new machines will provide quicker and higher quality copies for the public users.

- *Expanded Public Search Room Files* — As suggested by a public user, we have installed new steel cases in the north and south stack areas. These will provide us with space to store approximately 200,000 patents.

Dec. 4, 1987

THERESA A. BRELSFORD,
Assistant Commissioner
for Administration.

PATENT NOTICES

Certificates of Correction for the Week of Dec. 29, 1987

4,515,149	4,652,354	4,676,753	4,686,408
4,522,905	4,652,572	4,677,246	4,686,525
4,549,978	4,653,297	4,677,262	4,686,577
4,566,876	4,653,386	4,677,609	4,686,642
4,574,366	4,654,449	4,678,766	4,686,759
4,581,165	4,658,322	4,678,782	4,686,834
4,582,915	4,659,844	4,679,268	4,686,912
4,585,198	4,660,610	4,680,696	4,686,913
4,603,330	4,661,431	4,680,978	4,687,015
4,605,001	4,661,879	4,681,560	4,687,685
4,612,238	4,662,312	4,681,580	4,688,023
4,615,978	4,663,103	4,682,393	4,688,099
4,616,423	4,663,405	4,682,475	4,688,100
4,616,760	4,663,869	4,682,839	4,688,129
4,618,456	4,667,995	4,683,439	4,688,364
4,629,287	4,669,123	4,683,854	4,688,543
4,635,913	4,669,280	4,684,018	4,688,999
4,636,387	4,671,662	4,684,202	4,689,078
4,637,464	4,672,265	4,684,321	4,689,097
4,638,631	4,672,287	4,684,487	4,689,358
4,638,803	4,673,275	4,684,678	4,689,935
4,642,649	4,674,334	4,684,935	4,690,656
4,644,085	4,674,967	4,685,181	4,693,309
4,645,538	4,675,078	4,685,270	4,693,594
4,645,904	4,675,188	4,685,499	4,693,671
4,647,308	4,675,243	4,685,598	4,693,814
4,647,319	4,675,330	4,685,708	4,694,075
4,647,498	4,675,609	4,685,777	4,694,650
4,649,518	4,675,755	4,685,779	
4,650,506	4,676,307	4,686,118	

SPECIAL BOXES FOR MAIL

Special PTO mail box numbers should be used to allow forwarding of particular types of mail to the appropriate areas as quickly as possible. Such mail is forwarded directly to the appropriate area without being opened. Only the specified type of document should be placed in an envelope addressed to one of these special boxes. If any documents other than the specified type identified for each box are addressed to that box, they will be delayed in reaching the appropriate area for which they are intended.

The following special boxes should be used only for their specified purpose. Address mail as follows:

Box_____
Commissioner of Patents and Trademarks
Washington, D.C. 20231

Box 3	Mail for the Office of Personnel from NFC.
Box 4	Mail for the Office of Legislation and International Affairs.
Box 5	"No fee" mail related to trademarks (e.g. amendments to applications and request for extensions of time to file an opposition). Mail directed to the Trademark Trial and Appeal Board should have "Attention TTAB" on the envelope in addition to "Box 5".
Box 6	Mail for the Office of Procurement.
Box 7	Reissue applications for patents involved in litigation and any subsequently filed papers for those applications.
Box 8	All papers for the Office of the Solicitor.
Box 9	Coupon orders for the U.S. patent and trademark copies.
Box 10	Orders for certified copies of patent and trademark applications.
Box 11	Electronic Ordering Service (EOS).
Box 12	Contributions to the Examiner Education Program.
Box AF	Amendments or responses to final rejections in patent applications, submitted under the expedited processing program.
Box FWC	Mail related to File Wrapper and Continuations.
Box Interference	Communications relating to interferences and applications and patents involved in interferences.
Box M. Fee	Correspondence related to a patent that is subject to the payment of a maintenance fee.
Box Pat. Ext.	Applications for patent term extension.
Box PCT	Mail related to applications filed under the Patent Cooperation Treaty.
Box Reexam	Mail related to reexamination application.

Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries

The following libraries, designated as Patent Depository Libraries, receive current issues of U.S. Patents and maintain collections of earlier issued patents. The scope of these collections varies from library to library, ranging from patents of only recent years to all or most of the patents issued since 1790.

These patent collections are open to public use and each of the Patent Depository Libraries, in addition, offers the publications of the U.S. Patent Classification System (e.g. The Manual of Classification, Index to the U.S. Patent Classification, Classification Definitions, etc.) and provides technical staff assistance in their use to aid the public in gaining effective access to information contained in patents. With one exception, as noted in the table following, the collections are organized in patent number sequence.

Facilities for making paper copies from either microfilm in reader-printers or from the bound volumes in paper-to-paper copies are generally provided for a fee.

Owing to variations in the scope of patent collections among the Patent Depository Libraries and in their hours of service to the public, anyone contemplating use of the patents at a particular library is advised to contact that library, in advance, about its collection and hours, so as to avert possible inconvenience.

State	*Name of Library*	*Telephone Contact*
Alabama	Auburn University Libraries	(205) 826-4500 Ext. 21
	Birmingham Public Library	(205) 226-3680
Alaska	Anchorage Municipal Libraries	(907) 261-2907
Arizona	Tempe: Noble Library, Arizona State University	(602) 965-7140
Arkansas	Little Rock: Arkansas State Library	(501) 371-2090
California	Los Angeles Public Library	(213) 612-3273
	Sacramento: California State Library	(916) 322-4572
	San Diego Public Library	(619) 236-5813
	Sunnyvale: Patent Information Clearinghouse*	(408) 730-7290
	Denver Public Library	(303) 571-2347
Colorado	New Haven: Science Park Library	(203) 786-5447
Connecticut	Newark: University of Delaware Library	(302) 451-2965
Delaware	Washington: Howard University Libraries	(202) 636-5060
Dist. of Columbia	Fort Lauderdale: Broward County Main Library	(305) 357-7444
Florida	Miami–Dade Public Library	(305) 375-2665
Georgia	Atlanta: Price Gilbert Memorial Library, Georgia Institute of Technology	(404) 894-4508
	Moscow: University of Idaho Library	(208) 885-6235
Idaho	Chicago Public Library	(312) 269-2865
Illinois	Springfield: Illinois State Library	(217) 782-5430
	Indianapolis–Marion County Public Library	(317) 269-1741
Indiana	Baton Rouge: Troy H. Middleton Library, Louisiana State University	(504) 388-2570
Louisiana	College Park: Engineering and Physical Sciences Library, University of Maryland	(301) 454-3037
Maryland	Amherst: Physical Sciences Library, University of Massachusetts	(413) 545-1370
Massachusetts	Boston Public Library	(617) 536-5400 Ext. 265
	Ann Arbor: Engineering Transportation Library, University of Michigan	(313) 764-7494
Michigan	Detroit Public Library	(313) 833-1450
	Minneapolis Public Library & Information Center	(612) 372-6570
Minnesota	Kansas City: Linda Hall Library	(816) 363-4600
Missouri	St. Louis Public Library	(314) 241-2288 Ext. 390
Montana	Butte: Montana College of Mineral Science and Technology Library	(406) 496-4222
	Lincoln: University of Nebraska-Lincoln, Engineering Library	(402) 472-3411
Nebraska	Reno: University of Nevada Library	(702) 784-6579
Nevada	Durham: University of New Hampshire Library	(603) 862-1777
New Hampshire	Newark Public Library	(201) 733-7815
New Jersey	Albuquerque: University of New Mexico Library	(505) 277-5441
New Mexico	Albany: New York State Library	(518) 474-7040
New York	Buffalo and Erie County Public Library	(716) 846-7101
	New York Public Library (The Research Libraries)	(212) 714-8529
	Raleigh: D. H. Hill Library, N.C. State University	(919) 737-3280
North Carolina	Cincinnati & Hamilton County, Public Library of	(513) 369-6936
Ohio	Cleveland Public Library	(216) 623-2870
	Columbus: Ohio State University Libraries	(614) 292-6286
	Toledo/Lucas County Public Library	(419) 255-7055 Ext. 212
	Stillwater: Oklahoma State University Library	(405) 624-6546
Oklahoma	Salem: Oregon State Library	(503) 378-4239
Oregon	Philadelphia: Free Library	(215) 686-5330
Pennsylvania	Pittsburgh: Carnegie Library of Pittsburgh	(412) 622-3138
	University Park: Pattee Library, Pennsylvania State University	(814) 865-4861
	Providence Public Library	(401) 521-8726
Rhode Island	Charleston: Medical University of South Carolina Library	(803) 792-2371
South Carolina	Memphis & Shelby County Public Library and Information Center	(901) 725-8876
Tennessee	Nashville: Vanderbilt University Library	(615) 322-2775
	Austin: McKinney Engineering Library, University of Texas	(512) 471-1610
Texas	College Station: Sterling C. Evans Library, Texas A & M University	(409) 845-2551
	Dallas Public Library	(214) 670-1468
	Houston: The Fondren Library, Rice University	(713) 527-8101 Ext. 2587
	Salt Lake City: Marriott Library, University of Utah	(801) 581-8394
Utah	Richmond: Virginia Commonwealth University Library	(804) 257-1104
Virginia	Seattle: Engineering Library, University of Washington	(206) 543-0740
Washington	Madison: Kurt F. Wendt Library, University of Wisconsin	(608) 262-6845
Wisconsin	Milwaukee Public Library	(414) 278-3247

All of the above-listed libraries offer CASSIS (Classification And Search Support Information System), which provides direct, on-line access to Patent and Trademark Office data.

*Collection organized by subject matter.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

JAMES E. DENNY, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF December 5, 1987

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director	9-11-86
ORGANIC CHEMISTRY AND BIOTECHNOLOGY, GROUP 120—C. E. VAN HORN, Director	2-15-85
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 130—R. F. WHITE, Director	1-27-87
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director	1-29-86
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—G. GOLDBERG, Director	2-18-86
SPECIAL LAWS ADMINISTRATION, GROUP 220—K. L. CAGE, Director	10-14-85
INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—E. LEVY, Director	2-15-85
PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—TRYGVE M. BLIX, Director	5-12-86
ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—EDWARD E. KUBASIEWICZ, Director	5-06-86
COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP 260—S. G. KUNIN, Director	5-02-86
DESIGN, GROUP 290—K. L. CAGE, Director	1-18-85
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director	9-12-86
MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—S. N. ZAHARNA, Director	10-04-85
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—R. E. AEGERTER, Director	10-15-85
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—D. J. STOCKING, Director	2-06-87
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director	1-02-87

Expiration of patents: The patents within the range of numbers indicated below expire during December 1987, except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents ..... Numbers 3,543,308 to 3,551,900, inclusive

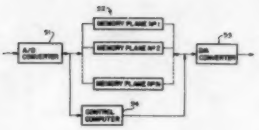
Plant Patents ..... Numbers 3,008 to 3,010 inclusive

REEXAMINATIONS

DECEMBER 29, 1987

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

B1 4,415,980 (802nd)
AUTOMATED RADIOGRAPHIC INSPECTION SYSTEM
Robert A. Buchanan, Palo Alto, Calif., assignor to Lockheed Missiles & Space Co., Inc., Sunnyvale, Calif.
Reexamination Request No. 90/000,968, Mar. 17, 1986.
Reexamination Certificate for Patent No. 4,415,980, issued Nov. 15, 1983, Ser. No. 239,611, Mar. 2, 1981.
Filed Mar. 17, 1986, Ser. No. 239,611
Int. Cl.[4] G06F *15/46*; H04N *5/32*
U.S. Cl. 378—58



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **5–9** and **11** is confirmed.

Claims **1–4** and **10** are cancelled.

New claims **12–16** are added and determined to be patentable.

12. A system for detecting a substantial inhomogeneity in a test object, said system comprising:

(a) means for forming a first image of said test object by causing penetrating electromagnetic radiation from a radiation source to pass through said test object and impinge upon a detector, said detector thereby generating a first electronic signal, said first electronic signal then being digitized, said digitized first electronic signal being stored in a first memory plane as said first image;

(b) means for causing displacement of one relative to another of said radiation source, test object and detector after said first image has been formed;

(c) means for forming a second image of said test object by causing penetrating electromagnetic radiation from said radiation source to pass through said test object and impinge upon said detector after said displacement has occurred, said detector thereby generating a second electronic signal, said second electronic signal then being digitized, said digitized second electronic signal being stored in a second memory plane as said second image; and

(d) means for subtracting one of said first and second images from the other to produce a subtractive image in which any substantial inhomogeneity in said test object appears.

B1 4,434,157 (803rd)
METHOD OF RECOVERING CELL ANTIGEN AND PREPARATION OF FELINE LEUKEMIA VACCINE THEREFROM
Richard G. Olsen, London, Ohio, assignor to The Ohio State University Research Foundation, Columbus, Ohio
Reexamination Request No. 90/001,225, Apr. 20, 1987.
Reexamination Certificate for Patent No. 4,434,157, issued Feb. 28, 1984, Ser. No. 366,352, Apr. 7, 1982.
Continuation-in-part of Ser. No. 104,789, Dec. 18, 1979, Pat. No. 4,332,793. This application Apr. 20, 1987, Ser. No. 366,352
Int. Cl.[4] A61K *39/12*
U.S. Cl. 424—89

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1–13** is confirmed.

1. A method for recovering virus-free, cell-free Feline leukemia associated neoantigen from cells infected with Feline Leukemia virus, which comprises:

(a) culturing said cells in a serum-containing growth medium;

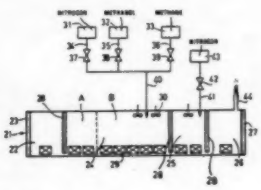
(b) transferring and maintaining said cultured cells in a serum-free medium under conditions and for a time adequate to accumulate said neoantigen shed from said cells in said serum-free medium;

(c) separating said cultured cells from the associated serum-free medium, thereby producing a cell-free, serum-free medium;

(d) reducing the volume of said cell-free, serum-free medium without substantial loss of said neoantigen therefrom, thereby producing a neoantigen-rich medium; and

(e) inhibiting protease enzymes in said neoantigen-rich medium.

B1 4,519,853 (804th)
METHOD OF CARBURIZING WORKPIECE
Michel Kostelitz, Versailles, and Philippe Queille, Viroflay, both of France, assignors to L'Air Liquide, Societe Anonyme Pour l'Etude et l'Exploitation des Procedes Georges Claude, Paris, France
Reexamination Request No. 90/000,974, Mar. 26, 1986.
Reexamination Certificate for Patent No. 4,519,853, issued May 28, 1985, Ser. No. 496,934, May 23, 1983.
Filed Mar. 26, 1986, Ser. No. 496,934
Claims priority, application France, May 28, 1982, 82 09328
Int. Cl.[4] C23C *8/22*
U.S. Cl. 148—16.5



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1–13** and **15–19** is confirmed.

Claim **14** is determined to be patentable as amended.

1. A method of carburizing metal workpieces, comprising the steps of:

loading workpieces to be carburized in a furnace;

maintaining the workpieces in a carbon enriching atmosphere containing carbon monoxide, hydrogen and nitrogen;

carrying out a first phase of the treatment at a first temperature from 850° to 1050° C.;

carrying out a second phase of the treatment directly thereafter at a second temperature, lower than said first temperature, from 700° C. to 950° C.;

using an atmosphere for the first phase containing at least 1% nitrogen, from about 20% to about 50% carbon monoxide by volume and from about 40% to about 75% hydrogen by volume and having a carbon potential of from about 1.1% to about 1.6% by weight; and

increasing the amount of nitrogen in said atmosphere for carrying out the second phase from two to thirty times the amount of nitrogen in the atmosphere used for the first phase so that the carbon potential for the second phase remains significant, but is reduced at least 0.5% by weight below the carbon potential for the first phase, such that the length of the combined first and second phases is less than for a conventional carburizing treatment.

REISSUES

DECEMBER 29, 1987

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

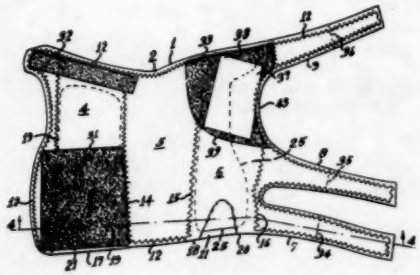
Re. 32,566
BOWLER'S GLOVE AND WRIST SUPPORT

Edward E. Patton, Jr., 5080 Fremont St., Jacksonville, Fla. 32210

Original No. 4,190,906, dated Mar. 4, 1980, Ser. No. 883,223, Mar. 3, 1978. Application for reissue Aug. 2, 1984, Ser. No. 637,119

Int. Cl.⁴ A41D *19/00*

U.S. Cl. 2—161 A **17 Claims**



1. In a bowling glove and wrist support, a palm plate having a first end portion and a second end portion, hand-attachable means carrying said plate for disposing said plate with its said first end portion [in and bridging] *extending across* the palmar arch of a wearer and terminating adjacently below the palm knuckle of the middle finger [and with its] *between the head line and the heart line of the palm,* said second end portion *of said plate extending* across the inner surface of the wrist spanning the wrist joint, and a prop carried by said means in a position overlying said first end portion *for providing said prop with support by said plate.*

Re. 32,567
SKI BRAKE

Anton Emert, Oberau; Walter Knabel, Murnau, and Manfred Richert, Munich, all of Fed. Rep. of Germany, assignors to Marker International Company, Salt Lake City, Utah

Original No. 4,515,388, dated May 7, 1985, Ser. No. 407,098, Aug. 11, 1982. Application for reissue Aug. 15, 1985, Ser. No. 765,689

Claims priority, application Fed. Rep. of Germany, Aug. 12, 1981, 3131917

Int. Cl.⁴ A63C *7/10*

U.S. Cl. 280—605 **5 Claims**

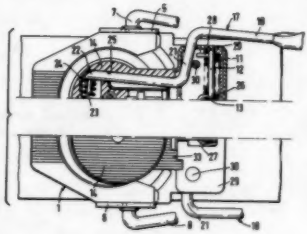
1. A brake for a ski, comprising:

a pair of laterally spaced wire levers, each wire lever being of predetermined diameter and comprising a pivot shaft intermediate a lower arm and an upper arm, said lever being rotatable between a braking position in which said lower arm extends below the ski and outboard from the ski and a non-braking position in which said lower arm does not extend below the ski;

a coil spring disposed between said wire levers for biasing said lower arms outboard from the ski, said coil spring having a diameter no larger than the diameter of either of said levers;

actuating means for urging each lever into said braking position;

a generally circular pedal being rotatable about an axis perpendicular to said pedal and having a thickness about equal to the predetermined diameter of said wire levers, said pedal further having a downwardly facing recess



containing the coil spring and receiving the upper arms of each of said wire levers, said pedal receiving pressure from the sole of a ski boot, said pedal being movable by the pressure of the ski boot from a non-skiing position to a skiing position, said levers being rotated into said non-braking position when said pedal means is moved into said skiing position; and

positioning means for holding each of said lower arms in an inboard position against the bias of said coil spring when said levers are in said non-braking position, said positioning means comprising a guide surface on said pedal for engaging and urging inward said upper arms when said pedal is in said skiing position.

Re. 32,568
SCREW ROTOR MACHINE AND ROTOR PROFILE THEREFOR

Ake Astberg, Nacka, Sweden, assignor to Svenska Rotor Maskiner Aktiebolag, Nacka, Sweden

Original No. 4,435,139, dated Mar. 6, 1984, Ser. No. 345,230, Feb. 3, 1982. Application for reissue Feb. 25, 1986, Ser. No. 834,219

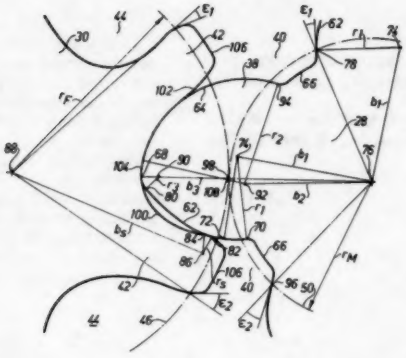
Claims priority, application United Kingdom, Feb. 6, 1981, 8103739

Int. Cl.⁴ F04C *18/16*

U.S. Cl. 418—201 **61 Claims**

52. A pair of intermeshing rotors having helical lands and intervening grooves and adapted for rotation about parallel axes within a working space of a screw rotor machine, one rotor of each pair being of female rotor type formed such that at least the major portion of each land and groove is located inside the pitch circle of the rotor, the other rotor of the pair being of male rotor type formed such that at least the major portion of each land and groove is located outside the pitch circle of the rotor, the lands of one rotor following the envelopes developed by the grooves of the other rotor to form a continuous sealing line between the rotors, each rotor groove being provided with a primary flank forming the peripherally outer wall of the leg of said chamber comprised of a female rotor groove and the peripherally inner wall of the leg of said chamber comprised of a male rotor groove, respectively, and a secondary flank forming the other wall of the related leg of the

chamber, characterized in that in a plane perpendicular to the rotor axes the primary flank of each male rotor groove comprises



a first flank portion following a circular arc the radial extremes of which lie within the range 0.9 to 1.15 times the pitch radius.

PLANT PATENTS

GRANTED DECEMBER 29, 1987

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

6,068
ROSE PLANT INTERLADA

G. Peter Ilsink, Leersum, Netherlands, assignor to Jackson & Perkins Company, Medford, Oreg.

Filed Jan. 13, 1986, Ser. No. 818,001
Int. Cl.[4] A01H *5/00*
U.S. Cl. Plt.—1 **1 Claim**

1. A new and distinct variety of rose plant of the shrub class, substantially as herein shown and described, characterized particularly as to novelty by the unique combination of its unusually large, round flower clusters, low petal count, delicate pink color, long arching branches and good mildew resistance.

6,069
ROSE PLANT JACEL

William A. Warriner, Tustin, Calif., assignor to Jackson & Perkins Company, Medford, Oreg.

Filed Jan. 10, 1986, Ser. No. 817,552
Int. Cl.[4] A01H *5/00*
U.S. Cl. Plt.—15 **1 Claim**

1. A new and distinct variety of rose plant of the hybrid tea class, substantially as herein shown and described, characterized particularly as to novelty by the unique combination of heavy production of bright yellow buds and flowers fringed with long bearded sepals, round undulating petals and possessing very little fragrance.

6,070
ROSE PLANT JACLAM

William A. Warriner, Tustin, Calif., assignor to Jackson & Perkins Company, Medford, Oreg.

Filed Jan. 10, 1986, Ser. No. 817,566
Int. Cl.[4] A01H *5/00*
U.S. Cl. Plt.—28 **1 Claim**

1. A new and distinct variety of rose plant of the floribunda class, substantially as herein shown and described, characterized particularly as to novelty by the unique combination of its very upright, vigorous growth habit, lustrous dark green foliage, attractive bright red flower color and its exceptional production of cut flower.

6,071
PLUM TREE (34EA305N)

Chris F. Zaiger, 537 Rosemore Ave., Modesto, Calif. 95351

Filed Dec. 30, 1985, Ser. No. 814,730
Int. Cl.[4] A01H *5/03*
U.S. Cl. Plt.—38 **1 Claim**

1. A new and distinct variety of plum tree of large size, vigorous upright growth and a regular and productive bearer of large, heart shaped, clingstone fruit; and further characterized by blooming approximately 7 days after Santa Rosa Plum (non-patented) and bearing fruit ripening approximately 30 days after Red Beaut Plum (U.S. Plant Pat. No. 2,539) and the fruit having an attractive yellow skin color, firm yellow flesh, excellent eating quality, and the ability to ship to long distance markets.

6,072
GERANIUM PLANT NAMED LUCY

Wolfgang Kirmann, Langenzersdorf, Austria, assignor to Mirko Vavra, Bisamberg, Austria

Filed Dec. 19, 1985, Ser. No. 810,672
Int. Cl.[4] A01H *5/00*
U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct cultivar of geranium named Lucy, as described and illustrated, and particularly characterized by its pale lavender-pink flower color, variegated with dark red-purple on upper petals and lower petals having a white center; vigorous, compact growth habit; early flowering; good bud production at night temperatures up to 16° C.; thus providing a long and continuous flowering period; and ease of propagation and good rooting habit.

6,073
GERANIUM PLANT NAMED TUTTI-FRUTTI

Ingeborg Schumann, Bad Ems, Fed. Rep. of Germany, assignor to Fischer Geraniums, Inc., Curacao, Netherlands Antilles

Filed Jul. 31, 1985, Ser. No. 761,096
Int. Cl.[4] A01H *5/00*
U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct cultivar of geranium named Tutti-Frutti, as described and illustrated, and particularly characterized by its light rose flower color; double flower form; early flowering and excellent flower production; good chlorophyll quality for transportation; fast rooting; excellent temperature tolerance; compact growth habit; and large flowerhead.

6,074
CHRYSANTHEMUM PLANT NAMED ATLANTIS

Leonard H. Shoesmith, deceased, late of Westfield, England (by May V. Shoesmith, executrix), assignor to Ball PanAm Plant Company, Parrish, Fla.

Filed Dec. 31, 1985, Ser. No. 815,002
Int. Cl.[4] A01H *5/00*
U.S. Cl. Plt.—77 **1 Claim**

1. A new and distinct cultivar of Chrysanthemum plant named Atlantis, as described and illustrated, and particularly characterized by its decorative capitulum type and flat capitulum form, pure white ray floret color, nine week flowering response, vigorous growth habit, medium plant height and upright branching pattern.

PATENTS

GRANTED DEC. 29, 1987

ERRATA

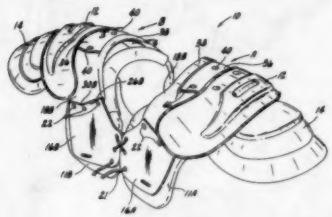
For CLASS	See PATENT NO.
437-200	4,715,109
074-731	4,715,145
101-269	4,715,298
437-101	4,715,930
405-072	4,716,400
503-210	4,716,424

PATENTS

GRANTED DECEMBER 29, 1987

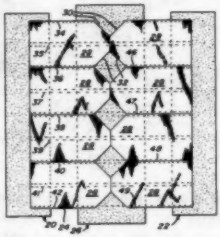
GENERAL AND MECHANICAL

4,715,066
SHOULDER PAD
Hal D. Mitchell, and Donald R. Walker, both of Rolla, Mo., assignors to Figgie International Inc., Willoughby, Ohio
Filed Oct. 24, 1986, Ser. No. 923,014
Int. Cl.[4] A41D *13/00*
U.S. Cl. 2—2 **12 Claims**



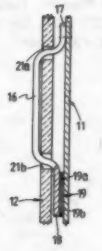
1. A shoulder pad for football players and the like comprising a left-hand member adapted to fit over the left shoulder and a right-hand member adapted to fit over the right shoulder, each of said members being of generally inverted U-shape as viewed from the side and comprising a chestplate member, a backplate member and an arch member, said arch member being relatively more rigid than said chestplate member and said backplate member, connecting means for fixedly interconnecting said chestplate member and said backplate member to said arch member, said arches being laterally spaced to provide an opening for the neck of a wearer with the spacing such that said arches lie adjacent and relatively close to the neck.

4,715,067
GOAL-KEEPER PAD
Robert Beauregard, St. Adolphe Dudswell, Canada, assignor to Roch Fortin, and Pierre Nizet, both of Quebec, Canada, part interest to each
Filed Apr. 16, 1987, Ser. No. 39,074
Int. Cl.[4] A41D *13/00*
U.S. Cl. 2—22 **6 Claims**



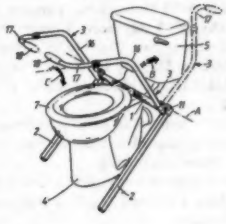
1. A goal keeper pad comprising:
(a) a heavily padded body, including:
(i) an upper thigh section;
(ii) an intermediate leg section; and
(iii) a lower foot section;
said sections having front, rear and side outer coverings; said coverings defining cut-out portions in a lower rear area of the leg section and the rear area of the foot section;
(b) an accordion-like joint sewn in covering arrangement to said cut-out portions, said joint being formed of:
(i) a pair of opposite outer bands of stretchable material;
(ii) an intermediate arrangement of pieces of resistant material disposed between said pair of bands; and
(iii) a third band of stretchable material centrally disposed on said intermediate arrangement; said bands and pieces being folded and sewn together to form said accordion-like joint.

4,715,068
GARMENT AND LINER COMBINATION
Milton D. Jacobson, 3300 Faring Rd., Birmingham, Ala. 35223
Filed Mar. 23, 1987, Ser. No. 29,185
Int. Cl.[4] A41D *27/02*
U.S. Cl. 2—272 **8 Claims**



1. A garment adaptable for use in various temperatures wherein the insulating qualities of the garment may be varied comprising:
(a) an outer portion wearable as a garment;
(b) a liner having insulating qualities determined in accordance with the temperature and wearable within said outer portion;
(c) a plurality of strap members affixed at one end thereof to the inside of said outer portion and having a free end;
(d) hook and pile fastening means affixed to said free end and the inside of said outer portion such that said free end may be secured to said outer portion; and
(e) means formed in said liner for allowing the passage of said strap members therethrough.

4,715,069
TOILET AIDS
David R. James, Tirley, England, assignor to James Industries Limited, Gloucester, England
Filed Jun. 3, 1986, Ser. No. 870,146
Claims priority, application United Kingdom, Jul. 5, 1985, 8517136
Int. Cl.[4] E03D *11/00*
U.S. Cl. 4—254 **8 Claims**



1. A toilet aid comprising a rear fixing bracket for mounting

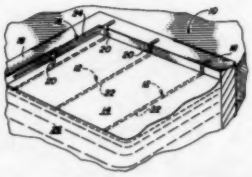
on a WC pan using the normal seat attachment bolt holes of the latter, two side support arms each terminating in an inturned outer end portion providing a handgrip for a user of the WC pan, and two side support legs, said arms and said legs being mounted on the bracket for separate pivotal movement about a common horizontal axis disposed adjacent the top surface of the WC pan in the region of said seat attachment bolt holes, said pivotal movement of said side support arms accommodating movement thereof between a lower operative position in which the arms are positioned to support the user of the WC pan and a raised inoperative position in which the arms do not obstruct normal use of the WC pan, and said support legs being adapted to contact the floor (when viewed from the side) forwardly of the base of the WC pan so that the legs support at least a major portion of any weight loading of the side support arms when the latter are operatively positioned.

4,715,070

FLOTATION POOL BLANKET

James K. Montijo, 2401 Pine St., Bakersfield, Calif. 93301

Filed Dec. 29, 1986, Ser. No. 947,264
Int. Cl.[4] E04H *3/19*
U.S. Cl. 4—498 **17 Claims**



1. A flotation pool blanket providing a barrier between the environment and the water surface of a swimming pool, and which is easily removable and replaceable, said swimming pool having a width, length, vertical sides and horizontal edges, the pool blanket comprising:

a blanket adapted to cover at least a portion of the water surface of the pool;

at least two elongated end ribs operably attached to said blanket, said end ribs having opposite ends and adapted to span the width of the pool; and

ears operably attached to said end ribs to secure said end ribs proximate the water level, said ears defining right angle members, having two ends, one end attached to said end ribs and the other end adapted to engage the horizontal edge of the pool whereby said end ribs secure said blanket at the water surface within the pool as a barrier to the surrounding environment and provide means to remove said blanket by picking up and gathering said end ribs to one end of the pool for removal.

4,715,071

HYDROTHERAPY MASSAGE METHOD AND APPARATUS

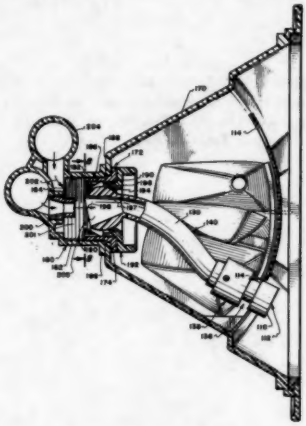
Melvyn L. Henkin, 5011 Donna Ave., Tarzana, Calif. 91356, and Jordan M. Laby, 3038 Bayshore, Ventura, Calif. 93001

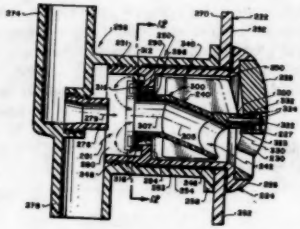
Continuation-in-part of Ser. No. 796,987, Nov. 12, 1985. This application Apr. 15, 1987, Ser. No. 38,780
Int. Cl.[4] A61H *33/02*; E03C *1/02*
U.S. Cl. 4—542 **42 Claims**

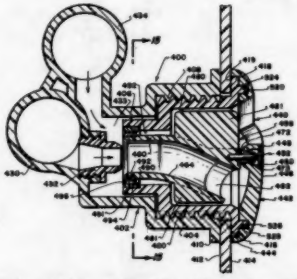
1. Hydrotherapy apparatus for discharging a fluid stream useful for impacting against and massaging an area of a user's body, said apparatus comprising:

supply means including a cavity and means for discharging a water jet along a defined axis into said cavity for creating a suction therein;

an elongated rigid conduit including a tubular supply section having a supply orifice and a tubular discharge section having a discharge orifice, said discharge section defining an axis misaligned with the axis of said supply section;







means mounting said conduit with said supply orifice opening to said cavity and with said supply section axis substantially aligned with the axis of said water jet whereby water supplied from said jet will flow through said conduit to said discharge orifice;

said mounting means including means supporting said conduit supply section for rotation about said supply section axis whereby said discharge orifice will translate along a nonlinear path describing a substantially planar area; and

passageway means for drawing water from outside said conduit into said cavity to mitigate the effect of said suction on said conduit.

23. Hydrotherapy apparatus for discharging a fluid stream useful for impacting against and massaging an area of a user's body, said apparatus comprising:

supply means for discharging a water jet along a defined axis;

an elongated rigid conduit including a tubular supply section having a supply orifice and a tubular discharge section having a discharge orifice, said discharge section defining an axis misaligned with the axis of said supply section;

means mounting said conduit with said supply orifice substantially aligned with the axis of said water jet whereby water from said jet will flow through said conduit to said discharge orifice;

said mounting means including means supporting said conduit supply section for rotation about said supply section axis;

a pin supported substantially in alignment with said water jet axis; and

means coupling said conduit to said pin for rotation thereabout for translating said discharge orifice along a circular path and for supporting said conduit against lateral and axial thrust.

4,715,072
SHOWER BARRIER

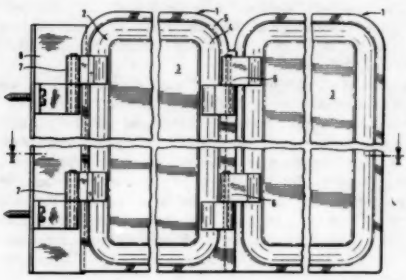
Jurgen-Peter Sudmann, Dietrich-Bonhoeffer-Str. 18, 2902 Rastede 1, Fed. Rep. of Germany

Filed Mar. 17, 1986, Ser. No. 840,517

Claims priority, application Fed. Rep. of Germany, Mar. 18, 1985, 3509683

Int. Cl.[4] A47K *3/22*

U.S. Cl. 4—607 **14 Claims**



1. A shower barrier comprising at least two substantially rectangular wall sections hingedly attached to each other, each having top, bottom and side edges delimited by a rectangular frame and having a plastic board for splash water protection, the peripheral edges of said frame being formed by a one piece profiled tubular shaped member and said frame supporting said plastic board, said board including holding elements consisting of integral sleeve pieces extending around the periphery gripping around the profiled tubular shaped member, each holding element having at least along each side edge substantially laterally projecting outer flanges adapted to overlap adjacent flanges of adjacent wall sections.

4,715,073
TILTABLE BED FRAME ASSEMBLY

Wilbur T. Butler, 4039 Spyglass Rd., Oklahoma City, Okla. 73120

Filed Aug. 22, 1986, Ser. No. 899,488

Int. Cl.[4] A61G *7/00;* **A47C** *21/00*

U.S. Cl. 5—62 **16 Claims**

1. An improved tiltable bed frame assembly comprising:

a main frame comprising:

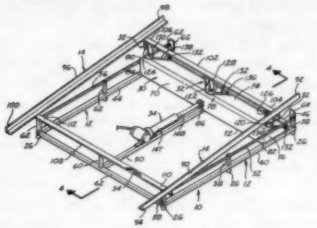
a plurality of elongated members, rigidly interconnected at their adjoining ends to provide a substantially rectangularly shaped main frame having opposed, spatially disposed sides and opposed, spatially disposed ends; and

a substantially centrally disposed support member extending between and connected to the elongated members of the main frame ends;

a mattress frame supported by the main frame;

a first inclined ramp supported by the centrally disposed support member of the main frame so as to be disposed below the mattress frame and selectively moveable therealong;

first ramp engaging means connected to the mattress frame and supported on the first inclined ramp for elevationally moving a portion of the mattress frame relative to the



main frame as the first inclined ramp is moved along the main frame;

actuation means supported by the main frame and connected to the first inclined ramp for selectively moving the first inclined ramp along the main frame in a to and fro direction so that the angular disposition of the mattress frame relative to the main frame is adjusted in response to travel of the first inclined ramp; and

ram means connected to the first inclined ramp for selectively moving the first inclined ramp along the main frame.

4,715,074
CRIB

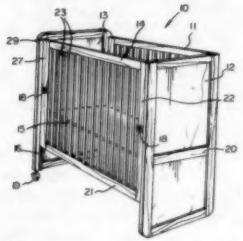
David R. Wallace, 112 Indiana Drive, Sault Ste. Marie, Ontario, Canada P6A 4Y5; George E. Rothschild, 1210 Prince of Wales Drive, Ottawa, Ontario, Canada K2C 1M9, and Robert W. Hamilton, 1133 Bayview Drive, Tsawwassen, British Columbia, Canada V4M 2R8

Filed Jul. 7, 1986, Ser. No. 882,787

Claims priority, application Canada, May 30, 1986, 510476

Int. Cl.[4] A47D *7/00*

U.S. Cl. 5—93 R **24 Claims**



1. a crib comprising:

(a) a generally rectangular, fixed-height back wall, said back wall including an upper horizontal face, a lower horizontal face, an inner face, an outer face and a pair of lateral faces, each said lateral face having an outwardly facing surface;

(b) a pair of generally rectangular end gables, each said end gable including an upper horizontal face, a lower horizontal face and a pair of lateral end faces, said end gable

including an inwardly-facing surface and an outwardly-facing surface, each said end gable being hingedly connected to an associated lateral face of said fixed-height back wall;

(c) at least two grooves within said inwardly facing surface of each of said end gables, each of said grooves on one said gable being on the same horizontal plane as an associate groove in the other said gable;

(d) a mattress support having a specified rigidity selectively movably retained within selected grooves in the same horizontal plane in each of said end gables;

(e) a generally rectangular, slidable dropside front wall disposed between said inwardly-facing surfaces of said end gables, said slidable dropside front wall being vertically slidable between a vertical upper limit and a vertical lower limit, said slidable dropside front wall including an upper horizontal face, a lower horizontal face, and a pair of lateral faces, each said lateral face having an outwardly facing surface; and

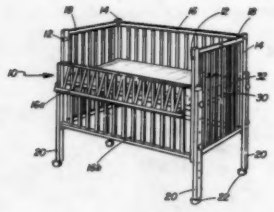
(f) cooperating vertically-extending guide means between an inwardly facing surface of the lateral end faces of each end gable and the vicinal outwardly facing surface of the lateral faces of said slidable dropside front wall, to permit relative vertical movement of said slidable dropside front wall while preventing relative horizontal movement between said slidable dropside front wall and said end gables.

4,715,075

ADJUSTABLE LEGS FOR FOLDING CRIB

Louis Shamie, 972 Dean St., Brooklyn, N.Y. 11238

Filed Feb. 3, 1987, Ser. No. 10,220
Int. Cl.[4] A47D *7/01, 7/03*
U.S. Cl. 5—93 R **6 Claims**



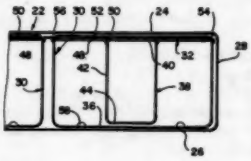
1. In a crib having a frame with four upright corner posts at the corners thereof, the improvement comprising, a leg for each post, each leg having a vertically extending guide channel therein, at least two vertically aligned and vertically spaced guide elements connected to each post, said guide elements of one post being slidable in the channel of one leg for vertical movement of said one leg with respect to its one post, each leg having a plurality of holes therethrough which are in greater number than the number of guide elements for one post, each hole communicating with said channel, said holes being spaced apart by an amount equal to the vertical spacing of said guide elements on one post, and bolt means engageable through two of said holes and into engagement with said at least two guide elements of one post for fixing a vertical position of each leg on its post.

4,715,076

WATERBED MOTION REDUCTION AND HYDRAULIC ENHANCEMENT SYSTEM

Isaac Fogel, Potomac, and Donald W. Keefer, Pasadena, both of Md., assignors to Classic Corporation, Jessup, Md.

Filed Oct. 17, 1985, Ser. No. 788,412
Int. Cl.[4] A47C *27/08*
U.S. Cl. 5—450 **17 Claims**



1. A hydraulically enhanced waterbed comprising:

a bladder for containing water, the bladder including a top wall, a bottom wall, and side walls connecting the top and bottom walls;

a plurality of outer hydraulic chambers positioned in an array within the bladder, each outer hydraulic chamber having a top surface generally oriented along the top wall of the bladder, a side surface extending from the top surface toward the bottom wall of the bladder, and a bottom surface extending from the side surface, the bottom surface and the side surface near the bottom surface constituting a bottom area of the outer hydraulic chamber, and at least one aperture in the bottom area of the outer hydraulic chamber; and

at least one inner hydraulic chamber positioned within at least one said outer hydraulic chamber, each inner hydraulic chamber having a top panel generally oriented along the top wall of the bladder and the top surface of the surrounding outer hydraulic chamber, a side panel extending from the top panel toward the bottom surface, and a bottom panel extending from the side panel, the bottom panel and the side panel near the bottom panel constituting a bottom area of the inner hydraulic chamber, and at least one aperture in the bottom area of the inner hydraulic chamber.

4,715,077

CONDUIT ON PASSENGER LOADING BRIDGE

Thomas E. Shepheard, Norfolk, Va., assignor to Air-A-Plane Corporation, Norfolk, Va.

Continuation-in-part of Ser. No. 798,960, Nov. 18, 1985, Pat. No. 4,620,339. This application Aug. 27, 1986, Ser. No. 900,850
The portion of the term of this patent subsequent to Nov. 4, 2003, has been disclaimed.
Int. Cl.[4] E01D *1/00*
U.S. Cl. 14—71.5 **6 Claims**

1. In combination with an extensible-retractable bridge having an inner end connected to an aircraft terminal and an outer end adapted to be connected to a parked aircraft,

said bridge being comprised of a plurality of telescoping tunnel sections whose adjacent ends overlap to greater or lesser extents according to the extension or retraction of the bridge,

a heat exchanger on the outermost tunnel section,

a fluid-temperature modifying means for supplying hot or cold liquid to the inner end of the bridge,

and fluid transmission means for supplying the temperature-modified liquid to the heat exchanger, said fluid transmission means including;

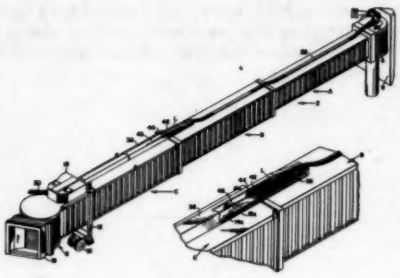
flexible hose means supported on said bridge and extending lengthwise thereof,

means for anchoring inner end portions of the hose means to the innermost tunnel section and means for anchoring

outer end portions of the hose means to the outermost tunnel section adjacent the inner end thereof,

means for connecting the outer end portions of the hose means to the heat exchanger,

the outer end portions of said hose means extending from the points of anchorage thereof towards the outer end of the bridge and thence looping back towards the inner end of



the bridge, the looped-backed portion of the hose means providing and taking up slack in the hose means in accordance with decrease and increase in the length of the bridge,

and tension means connected between one of the bridge sections and the hose means for maintaining the hose means under tension.

4,715,078

PAPERBOARD EDGE BUFFER AND CLEANER

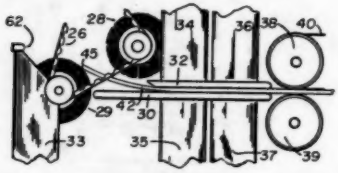
Paul C. Howard, Downey, Calif., and Ed Nowaczek, Boulder, Colo., assignors to Web Systems, Inc., Boulder, Colo.

PCT No. PCT/US83/00924, § 371 Date Mar. 11, 1985, § 102(e) Date Mar. 11, 1985, PCT Pub. No. WO84/02067, PCT Pub. Date Jun. 7, 1984

PCT Filed Jun. 20, 1983, Ser. No. 708,946

Int. Cl.[4] A46B *13/00*

U.S. Cl. 15—4 **10 Claims**



1. A Paperboard Edge Buffer and Cleaner comprising:

(a) a first buffing roller for buffing the leading edge of paperboard; said first buffing roller is disposed relative to the paperboard transport means so as to buff the upper surface of the paperboard in addition to the leading edge of the paperboard,

(b) a second buffing roller disposed near said first buffing roller for buffing the trailing edge of the paperboard, said second buffing roller is disposed relative to the paperboard transport means so as to buff the lower surface of the paperboard in addition to the trailing edge of the paperboard,

(c) a first vacuum means for removing particles remaining on the paperboard after the paperboard passes by said first and second buffing rollers,

(d) a pressure means for removing the particles to facilitate their transport by the vacuum means,

(e) a second vacuum means for removing particles from said first and second buffing rollers,

(f) a transport means for moving the paperboard into contact with said first buffing roller and said second buffing roller,

(g) a pair of interchangeable platforms, the first of said platforms being of such length as to cause the paperboard to pass over said second buffing roller without having said paperboard lower surface buffed, yet having the trailing edge buffed, and the second of said platforms being of such length as to cause the paperboard to pass over said second buffing roller and to have said paperboard lower surface buffed in addition to having the trailing edge buffed, and

(h) a plate means for causing the buffing rollers to wear evenly across their surfaces.

4,715,079

WASHING APPARATUS

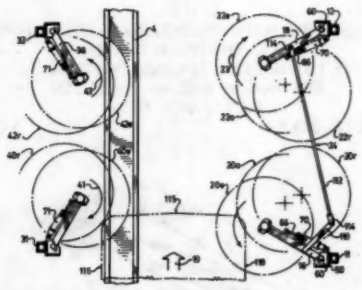
Douglas E. Kekewich, Islington, and Wendall Nelson, Brampton, both of Canada, assignors to Wash World Industries Limited, Canada

Filed Oct. 24, 1986, Ser. No. 922,611

Claims priority, application Canada, Oct. 23, 1986, 521239

Int. Cl.[4] B60S *3/06*

U.S. Cl. 15—97 B **21 Claims**



1. A washing apparatus, for use in a vehicle washing installation in which a vehicle is moved forwardly along a vehicle path, the washing apparatus comprising a support means, first and second arms, which are longitudinally spaced relative to the vehicle path and each of which is pivotally mounted at one end thereof and at a respective pivot location to the support means and extends towards the vehicle path, with the first arm extending forwardly and the second arm extending rearwardly relative to the vehicle path, a first washing wheel rotatably mounted to the other end of the first arm, a second washing wheel rotatably mounted to the other end of the second arm, drive means for rotating the first washing wheel so that the vehicle engaging side thereof travels rearwardly and for rotating the second washing wheel so that the vehicle-engaging side thereof travels forwardly, and biasing means urging the first and second washing wheels towards the vehicle path.

4,715,080

BRUSH EXTENSION HANDLE

Gregory J. Rydzicki, 130 W. Wilson #5, Orange, Calif. 92667

Filed Mar. 27, 1985, Ser. No. 716,634

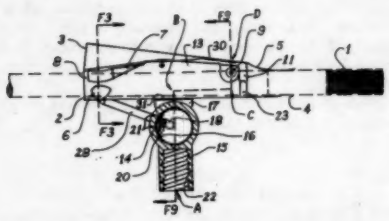
The portion of the term of this patent subsequent to Jun. 29, 2003, has been disclaimed.

Int. Cl.[4] A46B *5/02*

U.S. Cl. 15—146 **19 Claims**

1. An adjustable attachment for holding a brush and substantially provided for use therewith, comprising a longitudinally extending lower plate, said lower plate having a rear portion located away from said brush and a front portion adjacent said brush, said lower plate having an adjustable groove at its rear portion, an upwardly bent arc at its front portion, and two side walls extending upwardly from said rear portion, each of said

two side walls having an outwardly extending bent portion in its front portion for supporting a brush in the longitudinal direction, a longitudinally extending upper plate having a front portion adjacent said brush, said upper plate having a downwardly bent arc at its front portion, and two side walls extending downwardly from its upper portion, said upper plate having an adjustable means for holding a brush, and pivot means on the front portions of each of said plates whereby said upper plate is rotationally mounted on said lower plate for clamping said brush between said plates.

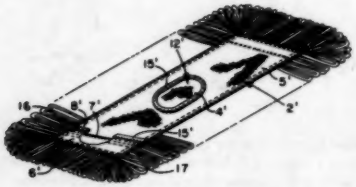


4,715,081

DUST MOP WITH IMPROVED BACKING FOR SLIP-THROUGH FRAME

Deo Welch, P.O. Box 1251, Longview, Tex. 75606

Filed Nov. 18, 1981, Ser. No. 322,534
Int. Cl.[3] A47L 13/24
U.S. Cl. 15—229.8 6 Claims



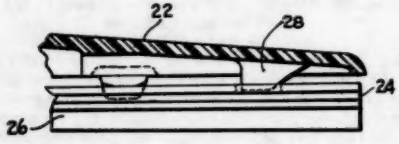
1. A dust mop comprising a backing having a plurality of yarns secured to one side thereof, the other side of said backing having a pair of oppositely facing pockets extending from the opposite ends of said backing, one of said pockets being substantially longer than the other pocket, said pockets being open at their innermost ends, the open end of the shorter of said pockets overlying the open end of said larger pocket.

4,715,082

WINDSHIELD WIPER BLADE ASSEMBLY

Neil A. Gowans, Buffalo, and William C. Riester, Williamsville, both of N.Y., assignors to Trico Products Corporation, Buffalo, N.Y.

Filed Sep. 2, 1982, Ser. No. 414,009
Int. Cl.[4] B60S 1/04
U.S. Cl. 15—250.42 7 Claims



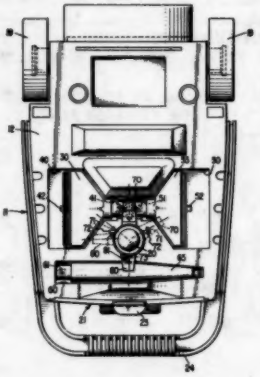
1. A windshield wiper blade assembly having an elongated flexible pressure distributing superstructure and a wiper refill unit, means on said superstructure for slidably receiving said wiper refill unit, said wiper refill unit having an elastomeric wiping element supported by a stiff, resilient elongate backing strip and retention means for limiting longitudinal displacement of said refill unit relative to said superstructure, characterized in that said retention means comprises an integral finlike projection depending from the undersurface of said superstructure on a medial longitudinal axis thereof and a slot penetrating said backing strip positioned to receive said depending projection when said refill until and said superstructure are operatively assembled.

4,715,083

VACUUM CLEANER TOOL STORAGE

Frank R. Harris, and Gordon E. Laing, both of Anderson, S.C., assignors to The Singer Company, Stamford, Conn.

Filed Sep. 29, 1986, Ser. No. 912,742
Int. Cl.[4] A47L 9/00
U.S. Cl. 15—323 3 Claims



1. A vacuum cleaner having a housing enclosing a motor blower and dirt collecting means, and further having means thereon supporting said housing for movement across a floor or a like planar surface, said housing being formed with respect to said supporting means with a top, sides and a bottom surface, said vacuum cleaner being adapted for selective operation with a cleaner attachment chosen from among at least one cleaner attachment, and means for storing said at least one attachment during a period of non-use thereof, said storing means comprising:

at least one cleaner attachment accommodating recess formed in said housing extending upwardly into said bottom surface; and

operator influenced latch means carried by said housing for selectively blocking movement of a cleaner attachment into or out of said attachment accommodating recess in said housing.

4,715,084

HAND VACUUM CLEANER

Gernot Jacob, Weissach-Flacht, and Leon Radom, Ellhofen, both of Fed. Rep. of Germany, assignors to Progress-Elektrogeraete Mauz & Pfeiffer GmbH & Co., Neurtingen, Fed. Rep. of Germany

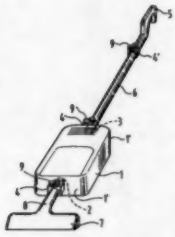
PCT No. PCT/EP85/00475, § 371 Date May 8, 1986, § 102(e) Date May 8, 1986, PCT Pub. No. WO86/01703, PCT Pub. Date Mar. 27, 1986

PCT Filed Sep. 16, 1985, Ser. No. 862,214

Claims priority, application Fed. Rep. of Germany, Sep. 17, 1984, 8427360

Int. Cl.[4] A47L *9/32*

U.S. Cl. 15—328 7 Claims



1. A hand vacuum cleaner comprising:

a housing receiving a suction fan and a dust collector;

a handle detachably connected to said housing;

a suction stub attached to said housing;

an intermediate pipe detachably connected to said housing via said suction stub, said intermediate pipe being capable of being removed from said suction stub and being reattached to another portion of said housing between said housing and said handle, said intermediate pipe having a slot and a depression in one end thereof, said depression having a given depth; and

at least one clamp for lockably attaching said intermediate pipe to said housing, said at least one clamp comprising a plug-in detent which cooperates with said slot of said intermediate pipe in order to actually align said intermediate pipe, said at least one clamp further comprising a rotatable cotter being eccentrically rotatable in order to move a portion of said cotter into said depression of said intermediate pipe, the movement of said cotter toward said depression being a distance which is substantially equivalent to the depth of said depression.

4,715,085

VACUUM CLEANER AND METHOD OF DISSIPATING ELECTROSTATIC CHARGE

Robert H. Johanson, Danville, Ky., assignor to Whirlpool Corporation, Benton Harbor, Mich.

Filed Dec. 19, 1986, Ser. No. 944,418

Int. Cl.[4] A47L *9/28*

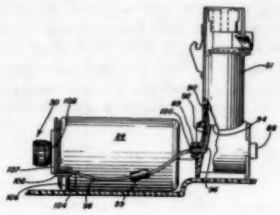
U.S. Cl. 15—339 24 Claims

17. A canister vacuum cleaner comprising

a floor cleaning unit having a rotatable brush and a brush motor for rotating said brush,

a canister, physically separate from said floor cleaning unit, having disposed therein a suction means for providing a flow of air from said floor cleaning unit to said canister, and

means for pneumatically interconnecting said canister and said floor cleaning unit, said pneumatically interconnecting means comprising a rigid wand and a wand handle and a flexible hose, said wand being adapted physically to engage and interconnect with said floor cleaning unit, said flexible hose being adapted physically to engage and interconnect with said canister, said wand handle being adapted physically to engage and to interconnect both said wand and said flexible hose,



said brush motor comprising means for dissipating an electrostatic charge accumulated on said rigid wand, said rigid wand being electrically conductively connected to said brush motor.

4,715,086

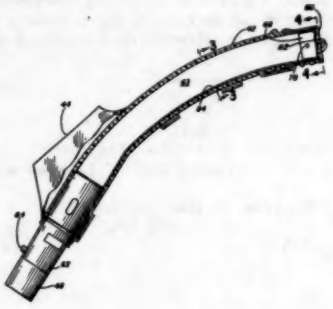
VACUUM CLEANER AND METHOD OF DISSIPATING ELECTROSTATIC CHARGE THROUGH CORONA DISCHARGE

Robert H. Johanson, Danville; Raymond M. Montgomery, Boyle County; Michael T. Herndon, Burgin, all of Ky., and Edward C. Peterson, St. Joseph Township, Berrien County, Mich., assignors to Whirlpool Corporation, Benton Harbor, Mich.

Filed Dec. 19, 1986, Ser. No. 944,417

Int. Cl.[4] A47L *9/28*

U.S. Cl. 15—339 32 Claims



1. A vacuum cleaner comprising

an elongate conductive tubular member and

means for dissipating an electrostatic charge accumulated on said tubular member, said dissipating means comprising means for effecting a corona discharge into the air flowing within said vacuum cleaner.

4,715,087

HIGH SPEED FLOOR BURNISHER

Mike J. Todd, Eagan, Minn., and Gary E. Palmer, Roselle, Ill., assignors to Hako Minuteman, Inc., Addison, Ill.

Filed Dec. 11, 1985, Ser. No. 807,679

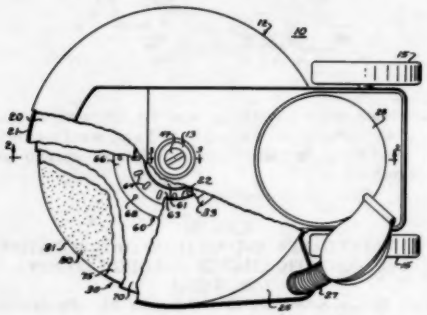
The portion of the term of this patent subsequent to Dec. 30, 2003, has been disclaimed.

Int. Cl.[4] B24B *29/00*; A47L *11/14, 11/20*

U.S. Cl. 15—385 22 Claims

1. A high speed floor burnisher comprising a housing adapted for movement along a floor; a vacuum shroud carried by said housing and defining a lower edge for sealing with said floor; means for resiliently mounting said shroud to said hous-

ing to maintain said seal with said floor during use; a motor carried by said housing; and a pad assembly beneath said shroud and driven at high rotary speed by said motor; said shroud forming a chamber above and about the sides of said pad assembly; said pad assembly including: a circular hub having an axis and having an outer surface; a burnishing pad; second mounting means fixedly securing said pad to said hub substantially coaxially therewith; means coupling the motor to drive said hub; collection means communicating with said



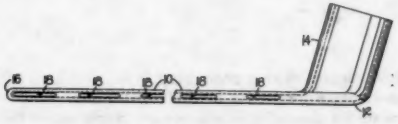
chamber; means connected to said pad assembly and forming a plurality of recesses extending from the location above said shroud, downwardly and outwardly beneath said shroud into said chamber for introducing make up air beneath said shroud and near the center thereof whereby high speed rotation of the pad assembly creates a flow of air into said chamber at a central part thereof, at least some air flowing outwardly in said chamber over said pad assembly to entrain particles therein and to deliver said entrained particles to said collection means.

4,715,088

VACUUM CLEANER ATTACHMENT

Gerald A. Haase, 1005 Country Club Rd., Lake Oswego, Oreg. 97034

Filed Aug. 29, 1986, Ser. No. 901,706
Int. Cl.[4] A47L 9/02
U.S. Cl. 15—415 A **4 Claims**



1. A vacuum cleaner attachment, comprising:

(a) a longitudinally elongated hollow body member having substantially flat, closed top and bottom walls, and a pair of opposite lateral side walls, the body member having a closed forward longitudinal end and an open opposite longitudinal end mounting a vacuum cleaner hose fitting, and

(b) suction openings through only at least one lateral side wall at spaced intervals along the body member,

(c) the body member configured with a slender profile for access to the limited vertical space under appliances and furniture, said flat bottom wall configured to be disposed adjacent a surface to be cleaned for movement of the attachment therealong, whereby said suction openings are disposed to permit air flow substantially only parallel to the surface to be cleaned.

4,715,089

TELESCOPING POLE CRANK ASSEMBLY

Anthony C. Schema, Faribault, Minn., assignor to Truth Incorporated, Owatonna, Minn.

Filed Jun. 16, 1986, Ser. No. 874,401
Int. Cl.[4] B25G 1/04
U.S. Cl. 16—115 **9 Claims**

1. A telescoping pole crank assembly comprising, a tubular pole crank, an extension pole slidably mounted in said pole crank for movement outwardly thereof to establish the overall length of the pole crank assembly, and means for locking said extension pole to said pole crank to maintain said overall length including a collar collet fixed to said pole crank and having a plurality of arcuately spaced clamping fingers extended beyond an end of the pole crank with a slot between each pair of clamping fingers, an outside collar with internal threads threadably mounted on the collar collet for movement longitudinally thereof in response to the relative rotation, and a pair of coacting circular ramps on the exterior of the clamping fingers and the interior of said outside collar for compressing the clamping fingers by rotation of the outside collar and interfitting means on the collar collet and outside collar to prevent separation of one from the other comprising a throat opening to a counterbore in an end of the outside collar defining an annular abutment surface, and an effectively circular flange on the outer end of the clamping fingers having a diameter to abut against said abutment surface and being engageable by the outside collar for inward movement of the clamping fingers to a smaller diameter to pass through said throat upon assembly of the outside collar and collar collet and thereafter expand behind said abutment surface.

5. A telescoping pole crank assembly comprising, a tubular pole crank, an extension pole slidably mounted in said pole crank for movement lengthwise thereof to establish the overall length of the pole crank assembly, means for locking said extension pole to said pole crank to maintain said overall length including a collar collet fixed to said pole crank and having a plurality of arcuately spaced clamping fingers extended beyond an end of the pole crank with a slot between each pair of clamping fingers, an outside collar with internal threads threadably mounted on the collar collet for movement longitudinally thereof in response to the relative rotation, and a pair of coacting circular ramps on the exterior of the clamping fingers and the interior of said outside collar for compressing the clamping fingers by rotation of the outside collar, and means for fastening the collar collet to the pole crank including aligned holes in said collet collet and pole crank, a pair of loose rivets one in each of said aligned holes, and said rivets being captured by said outside collar in surrounding relation to said collar collet.

6. A telescoping pole crank assembly comprising, a tubular pole crank with an offset end, a pair of pole handles rotatably

mounted on said pole crank with one handle positioned on said offset end, an extension pole slidably mounted in said pole crank for movement lengthwise thereof to establish the overall length of the pole crank assembly, and means for locking said extension pole to said pole crank to maintain said overall length including a collar collet fixed to said pole crank and having a plurality of arcuately spaced clamping fingers extended beyond an end of the pole crank with a slot between each pair of clamping fingers, an outside collar with internal threads threadably mounted on the collar collet for movement longitudinally thereof, in response to the relative rotation, and a pair of coacting circular ramps on the exterior of the clamping fingers and the interior of said outside collar for compressing the clamping fingers by rotation of the outside collar, and at least one raised rib on the extension pole extending longitudinally thereof and positioned in one of said slots to prevent rotation of the extension pole relative to the pole crank, each of said handles being formed of two identical halves with each half having a peg and a hole for a snap fit connection to the other half, a pair of screws extending from the pole crank at the location of the handles, and a pair of internal ribs on each handle capturing one of the screws therebetween to enable handle rotation without movement lengthwise of the pole crank.

4,715,090

DEMOUNTABLE HINGES

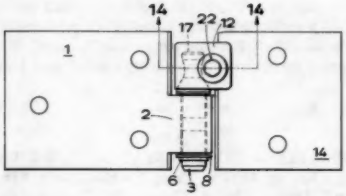
Barry S. Morris, Walsall, England, assignor to The Bloxwich Lock and Stamping Company Limited, Walsall, England

Filed Sep. 23, 1986, Ser. No. 910,647

Claims priority, application United Kingdom, Dec. 18, 1985, 8531168; Jul. 28, 1986, 8618369

Int. Cl.⁴ E05D *5/12*

U.S. Cl. 16—261 **6 Claims**



1. A demountable hinge comprising first and second knuckles, a hinge pin journalled in said first knuckle, said second knuckle having an eye and a transverse bore which breaks into said eye, means holding captive said hinge pin to said first knuckle against axial displacement relative thereto, a part of said hinge pin which projects from said first knuckle being dimensioned to be received within said eye of said second knuckle, and a threaded locking member dimensioned to be received in said transverse bore in said second knuckle, said part comprising a portion of substantially frusto-conical shape, said portion having a smaller diameter end positioned towards said first knuckle, said threaded locking member having a substantially frusto-conical locking surface, whereby when said hinge pin part is within said eye of said second knuckle said locking member can be threadedly tightened such that a locking engagement is provided between said frusto-conical locking surface of said locking member and said frusto-conical portion of said hinge pin.

4,715,091

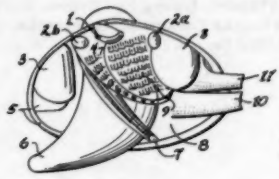
PROCESS FOR PREPARING CLAM CUTLET

Howard M. Rome, 110 Dean St., Taunton, Mass. 02780

Filed Mar. 23, 1987, Ser. No. 29,448

Int. Cl.⁴ A22C *29/04*

U.S. Cl. 17—48 **11 Claims**



1. A method for preparing a one-piece clam tongue for consumption, which comprises extracting the clam from its shell, removing the viscera from said tongue, separating the tongue from any remaining flesh, butterflying said tongue and passing it through a mechanical meat tenderizer to provide thereby a tender, edible one-piece clam cutlet.

4,715,092

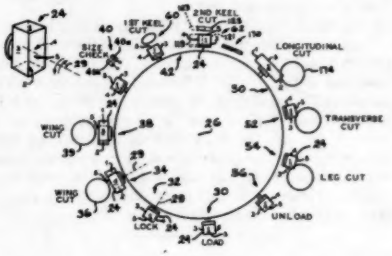
APPARATUS AND METHOD FOR CUTTING SLAUGHTERED POULTRY INTO SEPARATE PIECES

Bernard Lerner, Peninsula; Dana Liebhart, Cuyahoga Falls, and Rick S. Wehrmann, Hudson, all of Ohio, assignors to Automatic Packaging Systems, Inc., Twinsburg, Ohio

Continuation of Ser. No. 688,911, Jan. 4, 1985, Pat. No. 4,589,165. This application Jan. 17, 1986, Ser. No. 820,539

Int. Cl.⁴ A22C *21/00*

U.S. Cl. 17—52 **12 Claims**



3. A method for cutting slaughtered poultry into separate pieces, comprising the steps of:

(a) mounting a bird carcass to be cut onto a bird support module;

(b) conveying the carcass to a wing cutting station and severing wings from said carcass;

(c) conveying the carcass through a breast cutting station and severing a central breast section from the carcass by:

(i) moving the carcass past a stationary cutter to effect an initial cut commencing at a rear portion of said central breast section, said cut extending towards a front portion of said central breast section at a predetermined angle;

(ii) while continuously moving said module, reciprocating a cutting means, in synchronized motion with the movement of said module, towards and away from said bird to effect a second cut commencing at the front portion of said central breast section, said second cut extending towards the rear portion of said breast section at a predetermined angle such that said second cut intersects

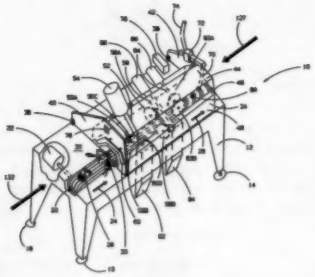
a cut made by the stationary cutter, thereby completely severing the central breast section from the carcass.

4,715,093

TRIMMING AND CUTTING APPARATUS FOR THE PREPARATION OF CRABS FOR MEAT EXTRACTION

George C. Lapeyre, New Orleans; Christopher G. Greve, Covington, and Hendrik J. Ruys, New Orleans, all of La., assignors to The Laitram Corporation, Harahan, La.

Filed Sep. 16, 1985, Ser. No. 776,453
Int. Cl.[4] A22C *29/02*
U.S. Cl. 17—71 16 Claims



1. Apparatus for preparing cooked crabs for further processing to separate meat from shell by centrifugal action comprising:

holding means for releasably securing a cooked crab body which has had the carapace shell removed in a selected orientation with respect to said holding means;

conveying means for moving said holding means securing such a crab body along a predetermined path and proximate a cutting means; and

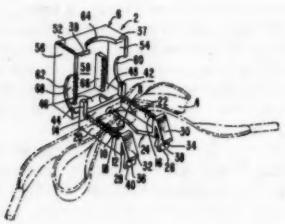
a cutting means for making a "V" cross-sectional shaped cut extending between the front and rear of the crab, the open or top if said "V" shape located at the top or back of the crab and a "tip" of the "V" extending into the crab body substantially parallel to the center line of the crab body such that said "tip" of said "V" is proximate to but does not cut through the belly shell of such a crab thereby separating a "V" cross-sectional shaped portion containing the viscera from said crab body while maintaining the structural integrity of said belly shell such that such crab body is not divided into two pieces.

4,715,094

SHOE LACE KNOT RETAINER

Charles W. Herdman, 1253 Stirling Rd., Dania, Fla. 33004

Filed Jun. 3, 1986, Ser. No. 869,990
Int. Cl.[4] F16G *11/00*
U.S. Cl. 24—119 19 Claims



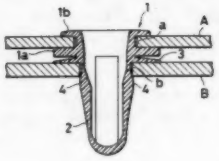
1. A shoelace knot retainer comprising a top portion and a bottom portion, said bottom portion comprising two spaced side walls forming an enclosure for a shoelace knot and having an opening between said side walls for receiving shoelaces, said top portion having two ribs, wherein said ribs lie laterally adjacent and parallel to but not engaged with said two side walls when said top portion is engaged over said bottom portion, to secure ends of said shoelace.

4,715,095

PLATE FASTENER

Norio Takahashi, Yokohama, Japan, assignor to Nifco Inc., Yokohama, Japan

Filed Dec. 29, 1986, Ser. No. 946,977
Claims priority, application Japan, Jan. 22, 1986, 61-10252
Int. Cl.[4] F16B *21/08*
U.S. Cl. 24—453 7 Claims



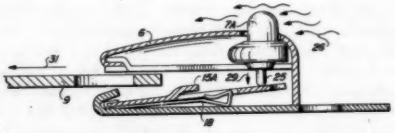
1. A single piece plate fastener made of a synthetic resin for fastening together two plates in a face-to-face relation to each other, comprising a head portion to be locked in an engagement hole formed in one of said two plates, said head portion comprising upper and lower flange-like portions and a boss-like portion connecting the upper and lower flange-like portions, a cylindrical leg portion integral with and perpendicularly extending from the bottom of said head portion and to be locked in a mounting hole formed in the other one of said plates, and an umbrella-like elastic engagement portion extending from the outer periphery of a stem portion of said leg portion and to be in close area contact with said other plate, said leg portion having a projection formed on the outer periphery to engage with the edge of a mounting hole formed in said other plate in a face-to-face relation to said engagement portion and a reduced-thickness axial hinge portion formed in a wall portion other than said projection, the wall of said leg portion being flexed in folding fashion about said hinge portion.

4,715,096

THERMALLY ACTUATED SEAT BELT FASTENER

Joseph A. Fleming, 4201 E. Pinal, Catalina, Ariz. 85635, and Stephen J. Haider, 1463 W. Chapala Dr., Tucson, Ariz. 85705

Filed Jul. 10, 1986, Ser. No. 883,960
Int. Cl.[4] A41F *1/00*
U.S. Cl. 24—602 5 Claims



1. A seat belt fastener comprising in combination:

(a) a tongue member including a transverse retaining edge;

(b) a latch mechanism including a movable retaining member for engaging the transverse retaining edge to prevent removal of the tongue member from the latch mechanism;

(c) release button means in the latch mechanism for moving the movable retaining member away from the transverse

retaining edge as the release button means is depressed by a user to release the seat belt fastener; and

(d) temperature-sensitive means within the release button means for forcing a thrust member from the release button means against the movable retaining member to move it away from the transverse retaining edge if the temperature of the release button means exceeds a predetermined level, thereby automatically releasing the seat belt fastener without depressing of the release button means if the temperature of the release button means exceeds the predetermined level.

4,715,097

ARRANGEMENT FOR THE ENTANGLEMENT OF MULTI-FILAMENT THREADS

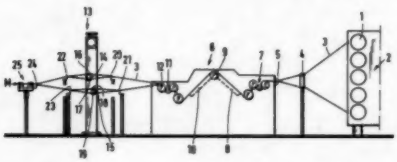
Bogdan Bogucki-Land, Offenbach, Fed. Rep. of Germany, assignor to Karl Mayer textilmaschinenfabrik GmbH, Fed. Rep. of Germany

Filed Oct. 3, 1986, Ser. No. 914,945

Claims priority, application European Pat. Off., Oct. 4, 1985, 85112571.6

Int. Cl.⁴ D02H *5/02*; D02J *1/08*

U.S. Cl. 28—172 **13 Claims**



1. An arrangement for the entanglement of multi-filament thread, said arrangement being operable to entangle warp threads travelling from spools on a creel to a warping machine, said arrangement having a jet arm adapted to communicate with a source of compressed air, comprising:

a plurality of adjacently placed plates, each adjacent pair of said plates having a separating element located between each, said plates being positioned to provide between them a plurality of parallel channels, each of said channels being shaped as an outwardly directed slot having side walls formed by a corresponding adjacent pair of said plates, said slot having a base formed by the separating element corresponding thereto, for each adjacent pair of said plates at least one of them including: (a) a reservoir adapted to communicate with said source of compressed air, (b) an airway between said reservoir and said source of compressed air, and (c) a bore in the side wall communicating with said reservoir for acting as a perpendicularly directed air jet, said plates having in said slot upstream and downstream of said air jets at least one thread support for keeping the threads out a predetermined distance from the base of said slot and in the influence of said air jet.

4,715,098

METHOD OF MAKING COAXIAL CABLE

Michael Booth, Swindon, and Richard J. Penneck, Lechlade, both of England, assignors to Raychem Limited, England

Division of Ser. No. 673,460, Nov. 20, 1984, Pat. No. 4,629,925.

This application Aug. 15, 1986, Ser. No. 897,470

Claims priority, application United Kingdom, Nov. 22, 1983, 8331156

Int. Cl.⁴ H04R *17/00*

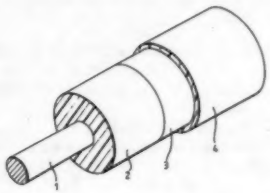
U.S. Cl. 29—25.35 **15 Claims**

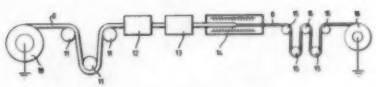
1. A method of forming a piezoelectric coaxial cable, which comprises the steps of:

(a) co-extruding a central metallic electrical conductor, and surrounding the conductor with an insulating layer to form a wire, the insulating layer comprising a material that is capable of being rendered piezoelectric by being oriented and polarized;

(b) subjecting the wire to a continuous polarizing operation comprising:

(i) passing the wire through a heating zone in which the wire is heated to a predetermined elevated temperature to melt the electrical conductor, and





(ii) passing the heated wire through a stretching zone and a polarizing zone so that the wire is stretched and, simultaneously or subsequently, the insulating layer is polarized, the insulating layer of the stretched wire having an internal radius that is not more than 0.5 times its external radius; and

(c) providing the stretched wire with an outer electrical conductor.

4,715,099

TERMINAL CRIMPING MACHINE

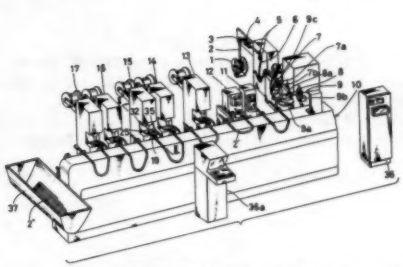
Koji Yoshida, Kobe, Japan, assignor to Shin Meiwa Industry Co., Ltd., Nishinomiya, Japan

Filed Sep. 5, 1986, Ser. No. 904,340

Claims priority, application Japan, Jan. 16, 1986, 61-4966[U]; Jan. 24, 1986, 61-9505[U]

Int. Cl.⁴ H01R *43/04*

U.S. Cl. 29—33 M **8 Claims**



1. A terminal crimping machine comprising wire transfer conveyor means having a plurality of wire transfer units for gripping and holding insulated wires which are cut to predetermined lengths at a given reference elevational level, said wire transfer conveyor means travelling along a transfer path for intermittently advancing said wire transfer units through said transfer path, an insulation stripping unit disposed laterally of said transfer path for stripping insulation from ends of said insulated cut wires, at east one terminal crimping unit disposed laterally of said transfer path in a location downstream of said insulation stripping unit as viewed in a travel direction of an upper run of said transfer conveyor means, said terminal crimping unit comprising a terminal crimping bed adapted to vertically move from a position below said given reference

elevational level of the ends of wires being transferred to said given reference elevational level of the ends of said wires, a crimping die disposed above said crimping bed and adapted for vertical movement for crimping terminals, and position adjusting means connected to said terminal crimping bed for adjusting an elevational position of said terminal crimping bed to a desired elevational level relative to said given reference elevational level.

4,715,100

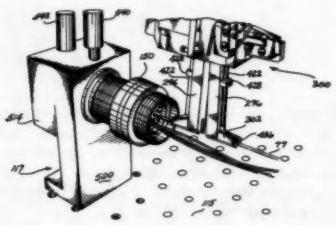
WIRE ROUTING TOOL FOR ROBOTIC WIRE HARNESS ASSEMBLY

Dan A. Cross, Seattle, Wash., assignor to The Boeing Company, Seattle, Wash.

Continuation-in-part of Ser. No. 741,318, Jun. 4, 1985, Pat. No. 4,677,734, which is a continuation-in-part of Ser. No. 539,768, Oct. 17, 1983, Pat. No. 4,520,966. This application Nov. 18, 1985, Ser. No. 798,827

Int. Cl.[4] H01R *43/00*

U.S. Cl. 29—33 M **18 Claims**



1. A tool for use by a robot in assembling a wire harness on a form board, comprising:

(a) connection means for releasably connecting the tool to the robot;

(b) grasping means for grasping a wire, the grasping means allowing the wire to slide freely through the tool or restricting movement of the wire at predetermined intervals, the grasping means defining a longitudinal axis; and

(c) insertion means for moving wire through the tool and for inserting one end of the wire into a connector on the form board by moving the grasping means substantially along the axis without moving the robot.

4,715,101

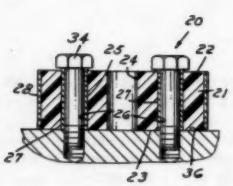
METHOD OF MAKING A PLASTIC BEARING

James A. Belanger, Northville, Mich., assignor to Belanger, Inc., Northville, Mich.

Division of Ser. No. 612,306, May 21, 1984, Pat. No. 4,586,831. This application Dec. 23, 1985, Ser. No. 812,668

Int. Cl.[4] B23P *11/00*

U.S. Cl. 29—149.5 C **10 Claims**



1. A method of making a bearing comprising the steps of:

forming a block having at least a first substantially flat side and a second substantially flat side, said block being formed from a high molecular weight plastic;

forming a cylindrical bearing bore in said block; and

locating one or more rigid sleeves in the block, so that each located rigid sleeve is spaced from the bearing bore, each located rigid sleeve extending from said first substantially flat side to said second substantially flat side, and each located rigid sleeve being capable of isolating a fastener inserted in said located rigid sleeve from contacting the sides when the fastener is tightened against said located rigid sleeve.

4,715,102

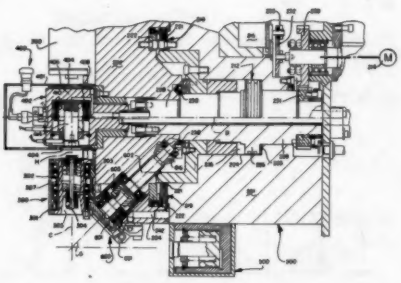
MACHINE TOOL

Heinz K. Wolf, Willoughby Hills, and Jyoti Mukherjee, North Royalton, both of Ohio, assignors to The Warner & Swasey Company, Cleveland, Ohio

Filed Oct. 31, 1986, Ser. No. 925,999

Int. Cl.[4] B23C *1/12*; B23P *23/02*

U.S. Cl. 29—27 R **31 Claims**

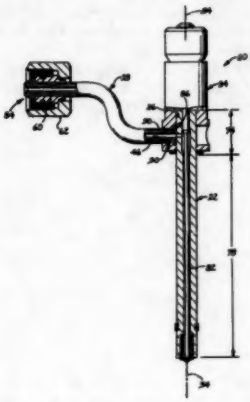


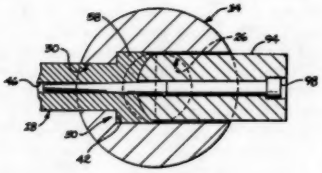
3. A machine tool (10) having a rotatable turret (200) with an end face (203) extending transversely to the axis of rotation (B) of said turret and a side face (204) extending transversely to said end face, said turret (200) including a base (201), a head portion (202) upon which said end and side faces (203, 204) of said turret are disposed, drive means (600) for transmitting drive forces through said turret to an output location between said end and side faces of said turret, said drive means (600) including a first drive gear (615) rotatably mounted on said base (201) of said turret and a second drive gear (616) rotatably mounted on the head portion of said turret, said machine tool being characterized by toolholder means (300) for rotating a cutting tool (T) about a first axis (C of FIG. 7) extending perpendicular to the axis (B) of rotation of said turret when said toolholder means is mounted on said end face (203) of said turret and for rotating a cutting tool (5) about a second axis (C of FIG. 10) extending parallel to the axis of rotation (B) of said turret when said toolholder means is mounted on said side face (204) of said turret, said head portion of said turret being rotatable relative to said base between a first operating position in which said toolholder means is operable to rotate a cutting tool and any one of a plurality of operating positions in which said toolholder means is ineffective to rotate a cutting tool, and retainer means (238) for holding said second drive gear (616) in a predetermined orientation in which teeth on said second drive gear are positioned for meshing engagement with teeth on said first drive gear (615), said retainer means (238) holding said second drive gear (616) in the predetermined orientation during rotation of said head portion of said turret relative to said base and movement of said second drive gear from said first operating position through said plurality of operating positions, said retainer means (238) releasing said second drive gear (616) for rotation relative to said head portion of said turret upon movement of said second drive gear from one of said plurality of operating positions to said first operating position to enable drive forces to be transmitted from said first drive gear to said second drive gear to rotate said toolholder means (300).

4,715,103
METHOD OF PRODUCING INTERFERENCE CONNECTION BETWEEN A FLUID LINE AND A FLUID INJECTOR

Tibor S. Jaksa, Pontiac; Richard F. Norton; Kenneth W. Hall, both of Peoria; Stephen J. Butler, Chillicothe; Craig C. Chicoine, and Wilford L. Bienz, both of Bloomington, all of Ill., assignors to Caterpillar Inc., Peoria, Ill.

Filed Aug. 4, 1986, Ser. No. 893,062
Int. Cl.[4] B23P *15/00*
U.S. Cl. 29—156.4 R **9 Claims**





1. A method of manufacturing a fluid injector including a body having a sealing exterior portion of a predetermined outside diameter, a fluid line having an internal passage and an end portion, and a housing having first and second bores intersecting one another wherein the housing first bore has a sealing interior portion and the housing second bore includes an internal shoulder positioned adjacent to and facing the sealing interior portion of the housing first bore, said method comprising the steps of:

inserting the end portion of the fluid line into an end portion of the housing second bore so that the fluid line end portion inwardly extends a predetermined depth, greater than zero, inside the sealing interior portion of the housing first bore;

forming the fluid line end portion with respect to the internal shoulder so that the fluid line end portion forms a generally complementary flange portion seated against the internal shoulder;

removing any excess of the flange portion which inwardly extends inside the sealing interior portion of the housing first bore so that the remaining flange portion of the fluid line is substantially flush with a predetermined inside diameter of the housing first bore, said predetermined inside diameter of the housing first bore being less than the magnitude of the outside diameter of the body sealing exterior portion;

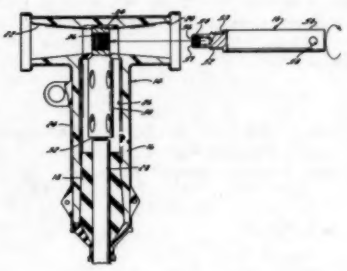
aligning the sealing exterior portion of the body with the housing first bore; and

inserting the sealing exterior portion of the body into the sealing interior portion of the housing first bore so that a fluid-sealed interference fit is formed between the sealing exterior portion of the body and both the flange portion of the fluid line and the sealing interior portion of the housing first bore.

4,715,104
INSTALLATION TOOL

Randall R. Schoenwetter, Waukesha; John Makal, Menomonee Falls, and Edward L. Sankey, New Berlin, all of Wis., assignors to RTE Corporation, Waukesha, Wis.

Filed Sep. 18, 1986, Ser. No. 908,843
Int. Cl.[4] B25B *27/14*
U.S. Cl. 29—271 **2 Claims**

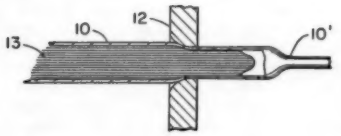


1. An installation tool for aligning the threaded end of a load break reducing tap plug with the threaded opening in a cable connector mounted in a visible break "T" connector assembly, the plug including a mounting bolt mounted in the threaded end of the plug, said tool comprising an elongated shaft having a threaded section on one end corresponding to the threaded opening in the cable connector, a non-threaded tubular extension on the threaded end of the shaft, the extension having a length greater than the width of the cable connector, and a threaded opening in the tubular extension and corresponding to the mounting bolt in the reducing tap plug.

4,715,105
METHOD OF PREPARATION OF PACKED FIBER GLASS REACTION VESSEL

Richard P. Beaver, Library, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Continuation of Ser. No. 750,445, Jul. 1, 1985, Pat. No. 4,657,742. This application Apr. 16, 1986, Ser. No. 852,866
Int. Cl.[4] B32P *17/00*
U.S. Cl. 29—419 G **3 Claims**



1. In a process of packing leached, porous glass fibers in an elongated non-porous wall metal tube, the improvement comprising filling the tube with said leached, porous glass fibers oriented in parallel with respect to each other and with respect to the long axis of the tube, said tube being of a diameter in excess of the final desired diameter of the tube, passing the tube with the leached, porous glass fibers packed therein through a

die, reducing the internal diameter of the tube by pulling it through the die in a cold drawing process to reduce the tube to an internal diameter such that the packing density of the leached, porous glass fibers contained in the finished tube after it emerges from the die is between 70 and 100 percent of the theoretical maximum density based on the diameter of the leached, porous glass fibers employed and the final diameter of the tube using a triangular pitch pattern packing method.

3. In a process of packing hollow glass fibers in an elongated non-porus wall metal tube, the improvement comprising filling the tube with hollow glass fibers oriented in parallel with respect to each other and with respect to the long axis of the tube, said tube having a diameter in excess of the desired final diameter of the tube, passing the tube having the hollow glass fibers packed therein through a die, reducing the diameter of the tube by pulling it through the die in a cold drawing process to reduce the diameter of the tube to an internal diameter such that the packing density of the hollow glass fibers in the finished tube is between 70 and 100 percent of the theoretical maximum density based on the diameter of the hollow glass fibers the final diameter of the tube and a triangular pitch pattern of packing.

4,715,106

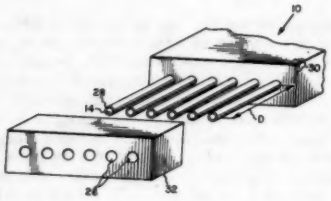
METHOD FOR BELT SPLICE PREPARATION

Paul J. Peterson, Cuyahoga Falls, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Mar. 7, 1986, Ser. No. 837,114

Int. Cl.[4] B23P *19/02*

U.S. Cl. 29—426.4 **4 Claims**



1. A method for preparing an end of a cable belt for splicing, said cable belt including an elastomeric body having embedded therein a plurality of stranded cables aligned in a reinforcement plane extending transversely across substantially the entire width of said belt, said stranded cables extending longitudinally of the belt over its entire length, said method comprising the steps of:

(a) preparing a transverse cross section of said cable belt end exposing an axial cross sectional end of each of said plurality stranded cables;

(b) positioning a tubular cutting tool against said cross section of said cable belt and around an end of one of said plurality of stranded cables, said cutting tool having an inside diameter greater than the cross section of said stranded cable and adapted to cut circumferentially around said stranded cable over a predetermined axial length of said cable;

(c) cutting a cylindrical core around said stranded cable, said cylindrical core extending for a predetermined distance through said elastomeric body along said stranded cable and co-axial therewith;

(d) repeating steps (b) and (c) for each of said plurality of stranded cables;

(e) cutting said elastomeric body in a cutting plane transverse of and perpendicular to said cable belt, said cutting plane intersecting each of said cylindrical cores around and between each of said plurality of stranded cables, said cutting plane extending through said elastomeric body at said predetermined distance from said end of said cable belt to form a separated segment of said elastomeric body;

(f) exerting a force in a direction coincident with said plane of said stranded cables and directed away from said end of said cable belt to effect removal of said separated segment of said elastomeric body, thereby exposing said plurality of stranded cables over said predetermined distance.

4,715,107

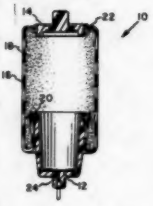
METHOD OF FORMING AN AIRSPRING WITH PNEUMATIC FITTING

Henry D. Fresch, Silver Lake, and Steven E. Hurt, N. Canton, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 659,107, Oct. 9, 1984, Pat. No. 4,621,796. This application Jun. 12, 1986, Ser. No. 873,645

Int. Cl.[4] F16F *9/04;* **F16L** *33/10*

U.S. Cl. 29—436 **4 Claims**



1. A method of manufacturing an airspring having a first rigid retainer, a second rigid retainer, a flexible air impervious membrane sealably attached to the retainers to form a working cavity, said method comprising the steps of: (a) sealingly attaching an end of said membrane to each of said first and second retainers to form a working cavity therebetween; (b) forming an orifice through at least one of said first or second retainer, said orifice connecting with said working cavity; (c) inserting an unthreaded coupling assembly into said orifice, said coupling assembly including a ring adapted to be received in the orifice to provide an airtight seal with the retainer, an annular sleeve including a plurality of jaws adapted for receiving a fluid conduit positioned within said ring, an O-ring seal positioned in the orifice inwardly toward said cavity adapted to seal against the fluid conduit, said ring having a flared portion for forcing the plurality of jaws of the sleeve into engagement with the fluid conduit.

4,715,108

MACHINE TOOL CAPABLE OF CHANGING WORN CUTTING TOOLS, SUCH AS SMALL DIAMETER DRILLS, WITH NEW ONES

Kiyoshi Sugiyama, Susono, and Kotaro Nakamura, Nagaizumi, both of Japan, assignors to Toshiba Kikai Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 5, 1986, Ser. No. 836,417

Claims priority, application Japan, Mar. 7, 1985, 60-45659; Feb. 6, 1986, 61-24767

Int. Cl.[4] B23Q *3/157*

U.S. Cl. 29—568 **19 Claims**

1. A machine tool capable of changing old cutting tools, worn from use, with new ones, comprising:

(a) frame means;

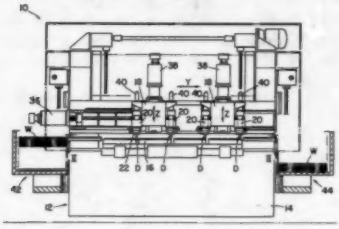
(b) a table mounted to the frame means for reciprocating movement in a predetermined horizontal direction, toward and away from a preassigned tool change position;

(c) at least one toolhead disposed over the table and releasably holding a cutting tool;

(d) an old tool pot on the table for temporarily holding in an upstanding attitude an old tool released from the toolhead, the old tool pot including a discharge passageway, defined by a pot body for the discharge of the old tool;

(e) a new tool pot on the table for temporarily holding in an upstanding attitude a new tool to be held by the toolhead in substitution for the old tool released therefrom in the old tool pot;

(f) an elongate new tool cartridge for slidably holding a row of upstanding new tools and having a tool outlet adjacent one end thereof, the new tool cartridge being mounted to the frame means and so disposed thereon that the tool outlet thereof overlies and is aligned with the new tool pot on the table when the table is in the tool change position;



(g) tool pusher means having actuator means for concurrently pushing, when the table is in the tool change position, the old tool in the old tool pot down into the discharge passageway and one of the new tools in the new tool cartridge down through the tool outlet thereof into the new tool pot; and

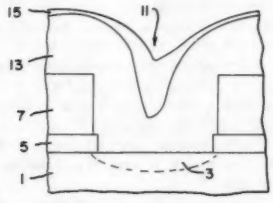
(h) old tool recovery means for recovering the successive old tools discharged through the old tool pot.

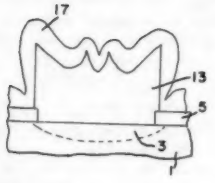
4,715,109

METHOD OF FORMING A HIGH DENSITY VERTICAL STUD TITANIUM SILICIDE FOR REACHUP CONTACT APPLICATIONS

Jeffrey M. Bridges, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Jun. 12, 1985, Ser. No. 744,163
Int. Cl.[4] H01L *21/28*
U.S. Cl. 437—200 **12 Claims**





1. A method of forming a contact for a semiconductor device, comprising the steps of:

(a) providing a semiconductor substrate;

(b) forming an insulating layer on said substrate having an aperture therein extending to said substrate;

(c) depositing a polycrystalline silicon layer in said aperture extending to said substrate and onto said insulating layer, said polycrystalline silicon layer having a depression therein extending into said aperture;

(d) forming a first oxide layer on said polycrystalline silicon layer, said first oxide layer being thicker in said depression than elsewhere;

(e) removing said first oxide layer and said polycrystalline silicon layer disposed over said insulating layer, retaining a portion of said first oxide layer in said depression;

(f) removing said first oxide layer in said depression and a portion of said insulating layer;

(g) depositing a layer of material taken from the class consisting of titanium, tantalum and molybdenum over said polycrystalline silicon layer; and

(h) reacting said layer formed in step (g) with the polycrystalline silicon layer therebelow to form a reacted layer.

9. A method of forming a contact for a semiconductor device, comprising the steps of:

(a) providing a semiconductor substrate,

(b) forming an insulating layer on said substrate having an aperture therethrough extending to said substrate,

(c) depositing a conformal polycrystalline silicon layer in said aperture and over said insulating layer whereby the polycrystalline layer over said aperture is thicker than over said insulating layer, said polycrystalline silicon layer having a depression therein extending into said aperture;

(d) forming an etch retarding layer on said polycrystalline silicon layer only over said depression etchable at a rate substantially slower than said polycrystalline silicon layer,

(e) removing a substantially equal depth of polycrystalline silicon from over said aperture and said insulating layer except beneath said etch retarding layer to leave polycrystalline silicon only in said aperture and along the entire exposed substrate therein, and

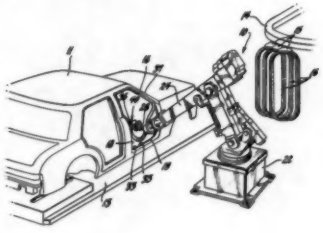
(f) removing said insulating layer.

4,715,110

APPARATUS OF A ROBOT FOR INSTALLING WEATHER STRIPPING IN A DOOR OR LIKE OPENING

Stephen St. Angelo, Rochester Hills, Mich.; George C. Carver, Albany; David W. Patterson, Duluth, both of Ga., and Owen K. Fremont, Rochester, Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Jul. 18, 1986, Ser. No. 888,238
Int. Cl.[4] B23P *21/00*; B23Q *15/00*
U.S. Cl. 29—701 **11 Claims**



1. A robot for installing a fixed length of weather stripping stored in a loading station into a body opening, said robot in combination comprising:

an arm supported on a pedestal movable in both horizontal and vertical planes;

means on the end of said arm to load said fixed length to said arm from said loading station; and

affixing means on the end of said arm and moved by said robot arm for interacting with the opening of said body

and guiding and applying said fixed length whereby said fixed length is affixed to the opening of said body.

11. A robot for installing a fixed length of weather stripping stored in a loading station into a body opening, said robot in combination comprising:

an arm supported on a pedestal movable in both horizontal and vertical planes;

a selectively operable gripper on the end of said arm to pull said fixed length from said loading station to load said arm;

a guide roller rotatably mounted to the end of said arm having a first position of engagement with said fixed length to align said fixed length and said guide roller having a second position out of engagement with said fixed length;

an idler roller on the end the of said arm supporting said fixed length generally opposite said guide roller in said first position of said guide roller; and

a powered pressure roller rotatively mounted on the end of said arm and moved by said robot arm having variable rotational velocity and compliance with respect to said arm in two axis, said pressure roller receiving said fixed length from said guide roller and guiding and applying said fixed length while tracing the opening of said body whereby said fixed length is affixed to the opening of said body.

4,715,111

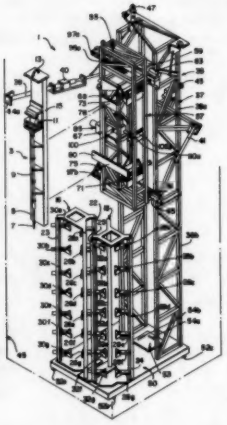
REMOTE REPAIR SYSTEM FOR NUCLEAR FUEL ROD ASSEMBLIES

Anoop Kapoor, Murrysville Boro; Edward J. Choby, Irwin, both of Pa.; Thomas J. Kramer, Cincinnati, Ohio; James E. Ranieri, Jeannette; Charles H. Roth, Jr., North Huntingdon; Donald E. Scheffer, Washington Township, Westmoreland County; John E. Spehar, Jr., Sewickley Township, Westmoreland County; Csaba Bessko, Pittsburgh, and Robert M. Blumstein, Greensburg, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 20, 1985, Ser. No. 746,897

Int. Cl.[4] B23P *19/00, 21/00;* **B23Q** *15/00*

U.S. Cl. 29—723 **30 Claims**



1. A system for remotely reassembling and reconstituting nuclear fuel rod assemblies, wherein said rod assemblies each include an array of nuclear fuel rods mounted within a support skeleton having rod-guiding grids, comprising:

(a) a rod handling means for gripping, lifting, lowering and ungripping a selected fuel rod;

(b) a first work station for securing a support skeleton, and a second work station for securing an array of fuel rods;

(c) positioning means for positioning the rod handling means in selected positions over the first and second work stations in order to grip, lift, lower and ungrip selected fuel rods in selected positions, and

(d) control means operatively connected to the rod handling means and the positioning means for remotely controlling the positioning of the rod handling means, and the gripping, lifting, lowering and ungripping of the rod handling means.

4,715,112

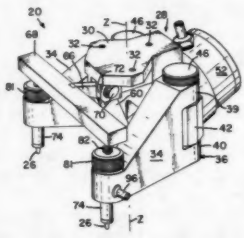
PICK-UP HEAD

Mark F. Jackson; Stephen P. Lawruk, both of Harrisburg; Dallas E. Schlegel, Mechanicsburg, and Richard V. Spong, Etters, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Dec. 10, 1986, Ser. No. 944,058

Int. Cl.[4] H05K *13/04*

U.S. Cl. 29—739 **11 Claims**



1. A pick-up head for use in picking up a workpiece having a pair of hollow rivets depending in spaced relationship from a lower surface thereof and opening into an upper surface thereof, and moving the workpiece towards a board to place said lower surface thereon thereby to insert said rivets into predetermined holes in the board, the pick-up head comprising:

a body having a vertical central axis and an upper face;

means on said upper face for attaching said body to a longitudinally movable shaft with said central axis coincident with the axis of the shaft;

a pair of workpiece pick-up arms each pivotally attached at one end of said body, for movement towards and away from each other about pivotal axes extending alongside, and on opposite sides of, said central axis;

means for releasably retaining said arms in desired relative angular positions about said pivotal axes;

an elongate riveting tool mounted for axial movement in the other end of each pick-up arm in a direction parallel to said central axis;

means for releasably securing each riveting tool to a rivet into which the tool has been inserted, to allow the pick-up head to pick up the workpiece; and

drive means on said body for driving each riveting tool through a working stroke to secure said rivet in said predetermined hole in said board and through a return stroke to withdraw said riveting tool from said rivet.

4,715,113

MACHINE COMPONENT INSTALLATION DEVICE

John L. Wickham, Glenarm, Md., assignor to The J. L. Wickham Company, Inc., Baltimore, Md.

Filed Jul. 2, 1986, Ser. No. 881,234

Int. Cl.[4] B23P *19/00, 21/00;* **B65G** *59/00*

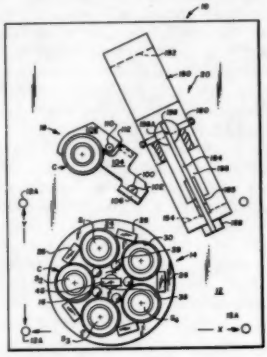
U.S. Cl. 29—792 **6 Claims**

1. A machine component installation device comprising:

a component feeder rotatably mounted on a base plate for controlled rotation about an axis, said component feeder

having at least two stacks of components to be installed, each stack selectively positionable at an active position;

a transfer arm mounted on said base plate for movement between first and second positions, said transfer arm including first and second pivotally connected members for grasping a component presented at said first position by



said component feeder and for pivoting motion to the second position; and

a component installation press having a ram operable along an installation axis substantially coincident with the second position, said ram operable to advance along the installation axis to carry a component grasped by said transfer arm.

4,715,114

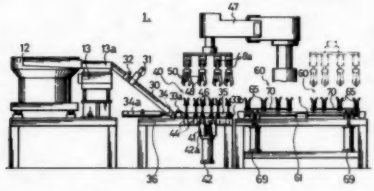
TENSION SPRING TAKEOUT DEVICE IN AN AUTOMATIC TENSION SPRING MOUNTING APPARATUS

Yutaka Yajima, Akishima, Japan, assignor to Tachi-S Co., Ltd., Tokyo, Japan

Filed Dec. 8, 1986, Ser. No. 939,068

Int. Cl.[4] B23Q 7/10; B23P 19/04

U.S. Cl. 29—809 **11 Claims**



1. A tension spring takeout device for use in an automatic tension spring mounting apparatus for automatically mounting a predetermined number of tension springs to frame members in a seat frame, said tension spring takeout device comprising:

a stock mechanism for sequentially separating a large number of tension springs from one another, arranging said tension springs in line, and stocking said tension springs therein;

a takeout mechansim including a predetermined number of takeout means located in said stock mechanism so as to correspond to the mounting intervals of said tension springs to said frame members, and operable such that a predetermined number of tension springs can be pushed out simultaneously; and,

a transfer device located so as to correspond to a direction in which said takeout mechanism pushes out said tension springs, and operable such that it can catch said tension springs pushed out, transfer said tension springs to the mounting portions of said frame members, and mount said tension springs to said mounting portions of said frame members.

4,715,115

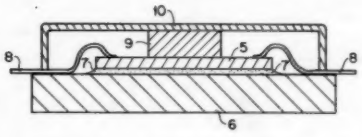
PACKAGE FOR WATER-SCALE SEMICONDUCTOR DEVICES

Michael O. King, Fremont, and Marvin S. Keshner, Mtn. View, both of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Apr. 3, 1986, Ser. No. 847,410

Int. Cl.[4] H01L 23/12, 23/14

U.S. Cl. 29—841 **6 Claims**



1. An apparatus for packaging a wafer comprising:

a substrate for supporting the wafer;

a viscous or semi-viscous fluid means for providing surface tension between the wafer and the substrate to restrict the wafer's motion in a direction perpendicular to the plane of the substrate;

a means mounted to the wafer for loosely clamping the wafer to the substrate for restricting the wafer's motion in a direction parallel to the plane of the substrate;

a cover attached to the substrate for shielding the wafer; and

an elastic means for restricting the wafer's motion in a direction perpendicular to the plane of the substrate wherein the elastic means is located between the wafer and the cover.

4,715,116

PRODUCTION OF DIELECTRIC BOARDS

John E. Thorpe, North Shields, and Gursharan S. Sarang, Ponteland, both of England, assignors to M&T Chemicals Inc., Woodbridge, N.J.

PCT No. PCT/GB84/00441, § 371 Date Oct. 21, 1985, § 102(e) Date Oct. 21, 1985, PCT Pub. No. WO85/02969, PCT Pub. Date Jul. 4, 1985

PCT Filed Dec. 19, 1984, Ser. No. 770,290

Claims priority, application United Kingdom, Dec. 19, 1983, 8333753

Int. Cl.[4] H05K 3/10

U.S. Cl. 29—846 **12 Claims**

1. A process for producing copper-clad dielectric boards, comprising the sequential steps of

(a) depositing a substantially uninterrupted layer of copper substantially free of micro-pores directly on a polished surface of a flat metallic press plate;

(b) providing the copper layer with a matte surface of copper of dendritic structure;

(c) bonding the matte surface to a dielectric material while applying heat and pressure to the press plate and the dielectric material in a laminating press and subsequently allowing the press to cool, the forces generated at the interface of the press plate and the copper layer, owing to the penetration of the dielectric material into the dendritic structure under pressure and the subsequent cooling of the dielectric material, being sufficient to overcome the adhesion of the copper layer to the polished surface of the press plate and thereby to cause the copper layer to be detached from the press plate;

(d) removing the resulting copper-clad dielectric board from the press and separating it from the press plate; and

(e) returning the press plate to step (a) and repeating steps (a) to (d).

4,715,117

CERAMIC WIRING BOARD AND ITS PRODUCTION

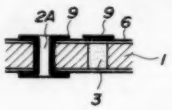
Eyo Enomoto, Oogaki, Japan, assignor to Ibiden Kabushiki Kaisha, Oogaki, Japan

Filed Mar. 14, 1986, Ser. No. 839,730

Claims priority, application Japan, Apr. 3, 1985, 60-69196

Int. Cl.[4] H01K *3/22, 3/10*

U.S. Cl. 29—851 **12 Claims**



1. A process for producing a ceramic wiring board, comprising the following steps (a) to (c):

(a) A step of making a sintered ceramic substrate having a plurality of holes, arranged regularly with a specified pitch

(b) A step of filling at least one of said plurality of through-holes with an electrical insulating material, and

(c) A step of forming by a plating process, simultaneously, a conductor circuit on the surface of said substrate and on the wall of at least one of the residual through-holes of said substrate.

4,715,118

CONNECTING STRIP FOR THE MANUFACTURE OF DIRECT TRANSFER ELECTRIC COMPONENTS AND MANUFACTURING METHOD FOR SUCH COMPONENTS

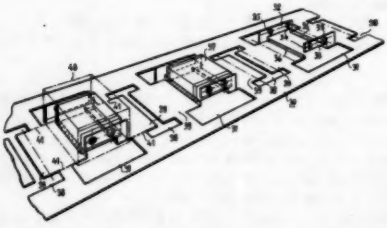
Gilles Bernard, Pourlans, and Francois Delalande, Seurre, both of France, assignors to Compagnie Europeene de Composants Electroniques, Courbevoie, France

Filed May 2, 1986, Ser. No. 858,767

Claims priority, application France, May 10, 1985, 85 07148

Int. Cl.[4] H05K *13/02;* **H01G** *1/14*

U.S. Cl. 29—856 **10 Claims**



1. A connecting strip useful in completion of manufacture of at least one direct transfer electric component presented as a solid body with a pair of body electrodes, said component, when completed having two electric terminations and a protective coating, each of said terminations including an electrical connection to one of the body electrodes, said strip comprising a metal foil with notches stamped out to provide:

at least two attachment tag means to be folded over near the terminations to maintain said solid body in position relative to said strip to ensure an electrical connection between each said body electrode and one of said attachment tag means, at least one of said attachment tag means including a boss with head means to support said body and provide an electrical connection to an adjacent body electrode, and

at least two strip electrode means to provide, after punching and folding, two exterior contacts to form said terminations, each of said terminations comprising a strip electrode means in contact with an attachment tag means which in turn is in contact with said body electrode.

10. A method of manufacturing an electric component from an intermediate form in which said electric component is presented as a solid body with a pair of body electrodes, said component, when completed having two electric terminations and a protective coating, each of said terminations including an electrical connection to one of the body electrodes, said method comprising the steps of:

(a) providing a strip comprising a metal foil with notches stamped out to provide at least two attachment tags to be folded over near the terminations to maintain said solid body in position relative to said strip to ensure an electrical connection between each said body electrode and one of said attachment tag means, and at least two strip electrodes to provide, after punching and folding, two exterior contacts to form said terminations, each of said terminations comprising a strip electrode in contact with an attachment tag which in turn is in contact with said body electrode,

(b) folding said attachment tags so as to receive said solid body,

(c) placing said solid body in position so that said attachment tags support said body while in electric contact with said body electrodes,

(d) soldering said body electrodes to the attachment tags,

(e) coating said body electrode with said strip acting as a support for the coating step,

(f) punching the strip to delimit each electric component and the strip electrodes, and

(g) folding and crimping the strip electrodes.

4,715,119

METHOD OF MANUFACTURING A PLUG

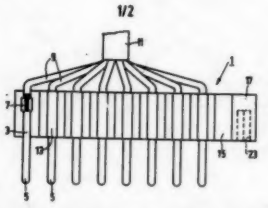
Henricus C. M. Joosten, Venlo, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 7, 1986, Ser. No. 849,228

Claims priority, application Netherlands, Apr. 11, 1985, 8501064

Int. Cl.[4] B29C *39/10, 53/02;* **H01R** *43/02*

U.S. Cl. 29—858 **11 Claims**



1. A method of manufacturing an electrical plug having at least three linear contact members arranged in a circle, a substantial portion of each contact member adjacent a first end thereof being an electrical contact and a remaining substantial portion of each contact member adjacent the opposite end thereof being a connection portion thereof which is electrically and mechanically connected to a conductor of a cable, the contact members being secured in a supporting body which is subsequently enclosed, together with the adjoining portion of the cable, by a plug body which leaves the contact portions of the contact members free; such method comprising forming said supporting body by the steps of:

aligning the contact members so as to be adjacent and mutually parallel in a straight line;

moulding the connection portions of the aligned contact

members in a ribbon-like, flexible plastic body so as to embed such connection portions in such plastic body;
connecting the connection portions of the contact members to the conductors of the cable;
rolling up the plastic body so as to form a cylinder which constitutes said supporting body; and
mounting such cylinder in a bush of insulating material.

4,715,120

RAZORS, AND SHAVING UNITS FOR RAZORS

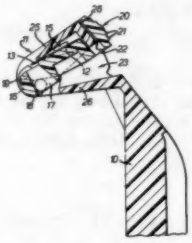
Angus J. McGready, Reading, England, assignor to Wilkinson Sword Limited, London, England

Continuation of Ser. No. 374,669, May 4, 1982, abandoned. This application Aug. 11, 1986, Ser. No. 895,546

Claims priority, application United Kingdom, May 19, 1981, 8115320

Int. Cl.⁴ B26B *21/14*

U.S. Cl. 30—57 **8 Claims**



1. A razor blade assembly whose components comprise an elongate handle, a top cap rigidly secured to one end of the handle, a razor blade having a cutting edge and underlying the top cap, a guard bar disposed at the front of said assembly and spaced from the front edge of the top cap to form an opening therebetween, and means permanently supporting the blade beneath the top cap for solely pivotal movement relative thereto about an axis parallel to said cutting edge between a first position in which said cutting edge is exposed at said opening for shaving and said blade, top cap and guard bar cooperatively define the shaving geometry of the razor blade assembly, and a second position in which said cutting edge is retracted from said opening and underlies said cap in spaced relation thereto.

4,715,121

GRIP SCISSORS

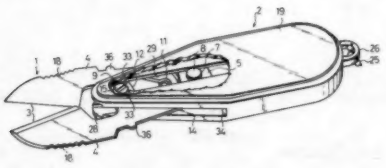
Makoto Sugiyama; Hiroshi Sugimura; Naoyoshi Machida, and Yoshiichi Murai, all of Seki, Japan, assignors to Kai Cutlery Center Co., Ltd., Seki, Japan

Filed Dec. 18, 1985, Ser. No. 810,919

Claims priority, application Japan, Sep. 19, 1985, 60-142968[U]

Int. Cl.⁴ B26B *13/00*

U.S. Cl. 30—253 **14 Claims**



1. A pair of grip scissors comprising
(a) a grip scissor body having a pair of mutually open/closeable scissor segments, said scissor segments having respective stopper portions which, when said scissor segments are moved in mutually opening directions, come into contact with each other to restrict the degree of opening said scissor segments,
(b) a housing capable of housing completely therein said grip scissor body in a housed state and of extending said grip scissor body outward to a projected state, said grip scissor body being movable in the lengthwise direction of said housing case,
(c) at least one slide groove formed in said housing case and extending in the lengthwise direction thereof,
(d) a slide coupled to said grip scissor body and movable reciprocatingly along said slide groove of said housing case, and
(e) lock means for automatically locking said grip scissor body when said body is retracted to the housed state or extended to the projected state.

4,715,122

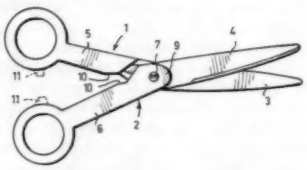
PLASTIC HANDLE SCISSORS

Olavi Lindén, Billnäs, Finland, assignor to Fiskars Oy AB, Helsinki, Finland

Filed Sep. 29, 1986, Ser. No. 912,317

Int. Cl.⁴ B26B *13/02*

U.S. Cl. 30—254 **4 Claims**



1. A scissors comprising two scissors halves which have a hinged connection with one another that disposes each said scissors half with an inner surface thereof adjacent to the other and an opposite outer surface thereof remote from the other, each said scissors half comprising an elongated blade member of metal or the like and a plastic handle member fixed to the blade member, said blade member having a blade portion which extends along one part of its length to a tip at one of its ends and on which there is a cutting edge and having a connecting portion which extends along another part of its length to an opposite end thereof and in which there is a hole for said hinged connection, and said handle member being formed in one piece and having a tongue which embraces the connecting portion of the blade member around the outer surface thereof, said scissors being characterized by:
A. the tongue of the handle member of one of said scissors halves having a male hinge element formed in one piece therewith that comprises
(1) a bese portion which fills said hole in said one scissors half and
(2) a cylindrical pin portion
(a) which is of substantially smaller diameter than said base portion,
(b) which projects axially beyond the inner surface of said one scissors half and a substantial distance into said hole in the other scissors half, and
(c) the axis of which is at predetermined distances from said tip and from said cutting edge of said one scissors half; and
B. the tongue of the handle member of said other scissors half being formed to provide a female hinge element that cooperates with said cylindrical pin portion to provide said hinge connection, said tongue of said other scissors half having a bore therein that defines a cylindrical bearing surface

(1) wherein said pin portion is received with a close but rotatable fit and

(2) the axis of which is at predetermined distances from said tip and from said cutting edge of said other scissors half.

4,715,123

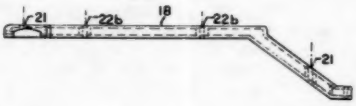
ROTARY TRIMMER WITH SELF-CONTAINED COLLECTION MEANS

Ansel N. John, Centerville, Ohio, and Richard L. Jackson, 7193 N. Preble County Line Rd., Lewisburg, Ohio 45338, assignors to Richard L. Jackson, Lewisburg, Ohio

Continuation-in-part of Ser. No. 702,400, Feb. 15, 1985, Pat. No. 4,672,744. This application Jul. 14, 1986, Ser. No. 885,141

Int. Cl.[4] B26B *7/00*

U.S. Cl. 30—276 **8 Claims**



7. In a rotary device for cutting vegetation and the like, comprising:

an angularly shaped housing, including a cylindrical housing having a defined channel extending from the forward portion thereof to the rearward portion thereof, said rearward portion of said angularly shaped housing providing collection space for said cut vegetation,

a handle mounted on said angularly shaped housing, and motor means mounted in said cylindrical housing,

said motor means including an extending power driving shaft, said shaft being perpendicular to the longitudinal axis of said handle, said handle including control means and energizing means for said motor means,

a rotatable blade housing member adapted to be driven by said power driving shaft, including at least one cutting blade member, said combination of blade housing member and said cutting blade member describing a plane generally perpendicular to said power driving shaft, and

a plurality of radially extending tines disposed forward of said angularly shaped housing and describing a radius exceeding a radius described by said cutting blade member, said tines describing a plane parallel to that described by said cutting blade member.

4,715,124

PROFILE GAUGE

Patrick W. Harrington, Hertfordshire, England, assignor to Florin Limited, London, England

Filed Apr. 16, 1986, Ser. No. 852,982

Claims priority, application United Kingdom, Apr. 26, 1985, 8510730

Int. Cl.[4] G01B *5/20*

U.S. Cl. 33—175 **8 Claims**

1. A profile gauge comprising a multitude of juxtaposed elongate blades which are independently biased into frictional contact with, and longitudinally slidable with respect to, a common supporting member in the form of a plate, each of said blades containing a longitudinal slot and said supporting member being engaged through all the slots of said blades, wherein the said blades are of plastics material and the bias is provided by resilience of the said plastics material, the slot in each blade containing a constriction at which the slot width is less than the thickness of the plate such that at least part of the slot in each blade is narrower than the plate is thick, whereby said blades are individually sprung onto said supporting member, the

constriction being defined by the sides bounding the slot converging toward mid-length.

4,715,125

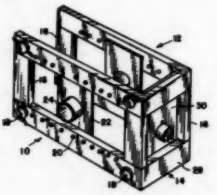
DOOR LOCK DRILLING TEMPLATE

Lester R. Livick, 15106 Beatty St., San Leandro, Calif. 94579

Filed Dec. 8, 1986, Ser. No. 939,419

Int. Cl.[4] B27G *17/08*; B23B *47/28*

U.S. Cl. 33—197 **5 Claims**



1. A template for the accurate cutting and drilling of latch and lock openings in a door stile, said template comprising:

first and second elongated parallel frame members rigidly connected together at their first end;

a pair of tubular hole cutting guides each connected to and extending laterally outward from a plate, said guides for receiving a circular saw;

means for attaching said hole cutting guides and connected plates to selected positions along said first and second frame members;

a tubular drilling guide connected to and extending outward and perpendicular to an end plate member secured to said first and second frame members at their said first end, said drilling guide for receiving a latch hole boring drill;

at least one pointed member longitudinally adjustable in said end plate member, said pointed member positioned in said end plate member to pierce a point on the vertical centerline of a door stile edge; and

clamping means coupled to at least one of said parallel frame members for clamping the template to the edge of a door stile.

4,715,126

ARCHERY BOW SIGHT

Terry Holt, 2181 Broadmore Ave., San Pablo, Calif. 94806

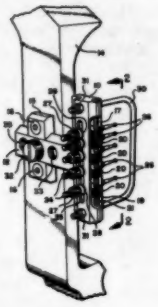
Filed Jan. 7, 1987, Ser. No. 1,231

Int. Cl.[4] F41G *1/46*

U.S. Cl. 33—265 **9 Claims**

1. An archery bow sight, comprising a plurality of elongate sighting pins; a plurality of sighting pin receiving and holding means; a mounting block; a longitudinal groove in said mounting block that receives the plurality of sighting pin receiving and holding means for sliding movement therealong, said groove defining a path of travel for said plurality of sighting

pin receiving and holding means; a threaded shaft extending along the length of said groove; mating thumbwheel means mounted in respective sighting pin receiving and holding means whereby rotational movement of a thumbwheel by a user imparts longitudinal movement to the respective pin receiving and holding means for moving respective sighting pin receiving and holding means back-and-forth along said path of travel and for maintaining the position of said individual receiving and holding means at any position along said path when operation of the means for moving ceases; and means for mounting the sight on an archery bow.

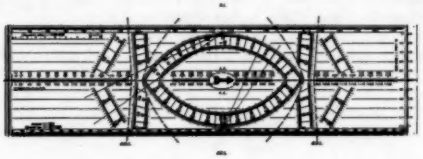


4,715,127

RULER FOR MEASURING ANGLES BETWEEN AN ORIENTED AXIS AND A VECTOR

Eugenio P. Bernabeu, Tramontana 16, San Just Desvern, Barcelona, Spain

Filed Jan. 21, 1986, Ser. No. 820,096
Claims priority, application Spain, Jan. 19, 1985, 284.265
Int. Cl.[4] G01B 3/02
U.S. Cl. 33—494 **6 Claims**



1. A ruler for measuring angles increasing in a clockwise direction between 0° and 360° between an oriented axis and a vector, comprising an essentially flat and transparent body including, in combination;

a perimeter including two edges parallel with each other;

an arrow situated on a part of said body and parallel with said edges;

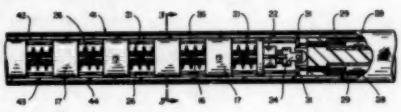
a surface on said ruler subdivided into eleven zones separated from each other by five lines, including a longitudinal line and four zonal lines, said longitudinal line being a straight line parallel with and equidistant from said edges, said longitudinal line being interrupted at its central part, where a closed curve is provided; said zonal lines each reaching from one of the said edges to the other without crossing each other, two of said zonal lines being on one side of said closed curve and the other two being on the other side of said closed curve.

4,715,128

CURVATURE PROBE AND METHOD

Richard E. Cummings, Camino; Charles S. Mackey, Bakersfield, both of Calif.; Robert W. Dickinson, 40 Maplewood Dr., San Rafael, Calif. 94901; Ben W. O. Dickinson, III, 2125 Broderick St., San Francisco, Calif. 94115, and Merle D. Larsen, Concord, Calif., assignors to Ben Wade Oakes Dickinson III and Robert Wayne Dickinson, both of San Francisco, Calif.

Filed Dec. 19, 1985, Ser. No. 811,531
Int. Cl.[4] G01B 7/28
U.S. Cl. 33—544 **16 Claims**



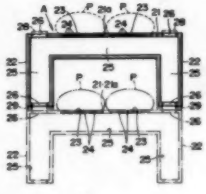
1. In a curvature probe: an axially extending flexible shaft, a plurality of axially spaced guide members mounted on the flexible shaft and being movable axially of the shaft, means between adjacent ones of the guide members for maintaining the guide members in a spaced relationship, two pairs of axially extending sensing wires positioned in quadrature about the shaft with the two wires in each pair being positioned on opposite sides of the shaft, said wires passing freely through axially aligned openings in the guide members and being free to move relative to each other in an axial direction upon bending of the probe, and means responsive to the relative axial positions of the two wires in each pair for providing an output signal corresponding to the curvature to which the probe is bent.

4,715,129

SHELF STRUCTURE FOR DRYING SACKED MATTER

Shiichiro Uchida, Fujisawa, Japan, assignor to Shonetsugaku Kenkyusho Co., Ltd., Tokyo, Japan

Filed Jan. 23, 1986, Ser. No. 824,573
Claims priority, application Japan, Jun. 24, 1985, 60-95468[U]
Int. Cl.[4] F26B 9/00
U.S. Cl. 34—195 **3 Claims**



1. A shelf structure for drying sacks of particulate matter, said shelf structure comprising a plurality of hollow pallet-shaped shelves, each one of said plurality of hollow pallet-shaped shelves comprising:

(a) a hollow top board having a hollow internal portion defined therein and a carrier section defined on the top thereof, said carrier section serving, in use, to support at least one sack of particulate matter, said carrier section having a plurality of through-holes therein providing communication between said hollow internal portion and the exterior of said hollow top board;

(b) a plurality of hollow legs extending downwardly from said hollow top board at horizontally spaced intervals, each one of said plurality of hollow legs having a hollow internal portion defined therein, each one of said hollow internal portions in said plurality of hollow legs being in communication with said hollow internal portion in said

hollow top board, said plurality of hollow legs being sized, shaped, and positioned so that said plurality of hollow pallet-shaped shelves can be stacked vertically on top of each other to form said shelf structure; and

(c) means for creating a pressure differential between said hollow internal portion and the exterior of said shelf structure, said means comprising:

(i) a first opening in the bottom of at least one of said plurality of hollow legs on each one of said plurality of said hollow pallet-shaped shelves and

(ii) a second opening in said hollow top board on each one of said plurality of hollow pallet-shaped shelves sized, shaped, and positioned to communicate with said first opening in the next higher one of said plurality of hollow pallet-shaped shelves when said plurality of hollow pallet-shaped shelves are stacked to form said shelf structure.

4,715,130

CUSHION SYSTEM FOR SHOES

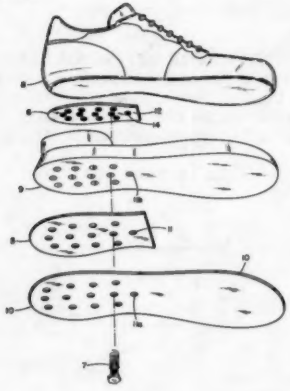
Alessandro Scatena, P.O. Box 11, 55060 Guamo, Lucca, Italy

Filed Jul. 2, 1986, Ser. No. 881,086

Claims priority, application Italy, Sep. 20, 1985, 87710 A/85

Int. Cl.[4] A43B *21/30, 21/26*

U.S. Cl. 36—27 **6 Claims**



1. A cushioning assembly for the rear part of a shoe comprising an outer sole (10), an upper sole (6), a first intersole (5) positioned adjacent said outer sole, at least one spring (3) positioned between said outer sole (10) and said upper sole (6), said spring having a top part and a lower part, said upper sole having at least one tooth (14), said tooth entering the top part of said spring and supporting said top part and holding the spring in place, said first intersole (5) having at least one threaded orifice (11), a pin (1) having a rigid base (2), an externally threaded portion (4), said threaded portion of said pin (4) being engageable with said threaded orifice (11) of said first intersole, said outer sole (10) having at least orifice (11a) in alignment with said threaded orifice of said intersole, said externally threaded portion of said pin passing through said orifice of said outer sole (10), said orifice of said outer sole being of size essentially equal to said base (2) of said pin, the bottom part of said spring resting on said pin.

4,715,131

ORTHOPEDIC SUPPORTING MEMBER, PARTICULARLY ORTHOPEDIC SHOE INSERTS, AND METHOD OF ITS MANUFACTURE

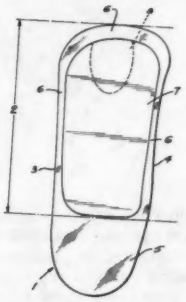
Juergen Kremendahl, Remscheid, Fed. Rep. of Germany, assignor to Globus Fussstiltzenfabrik Karl Kremendahl, Remscheid, Fed. Rep. of Germany

Filed Feb. 18, 1986, Ser. No. 830,682

Claims priority, application Fed. Rep. of Germany, Mar. 28, 1985, 8509263[U]; European Pat. Off., Jul. 10, 1985, 85112695.3

Int. Cl.[4] A43B *13/38*

U.S. Cl. 36—44 **15 Claims**



15. An orthopedic support member, comprising a body part composed of polyethylene terephthalate having zones of different stiffnesses, said body part being formed as an orthopedic shoe insert including a curved support zone for a central foot part and a heel zone for a heel of the foot with said zones formed of one-piece with one another, said support zone being stiff and bending-resistant and having a core composed of at least somewhat crystalline polyethylene terephthalate, said heel zone being elastic and composed of amorphous polyethylene terephthalate.

4,715,132

SKI BOOT FOR DISAPPEARING-TYPE BINDINGS

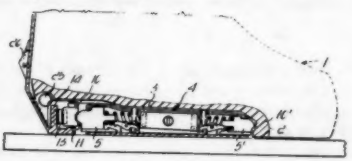
Alessandro Pozzobon, Paderno di Ponzano Veneto, Italy, assignor to Nordica S.p.A., Montebelluna, Italy

Filed Aug. 18, 1986, Ser. No. 897,562

Claims priority, application Italy, Sep. 4, 1985, 22066 A/85

Int. Cl.[4] A43B *5/04;* A63C *9/086*

U.S. Cl. 36—117 **4 Claims**



1. In a ski boot and safety ski binding assembly, comprising a binding mechanism adapted to be fixed onto the ski and including opposite outwardly projecting spring biased latch members defining a longitudinal direction of the binding and wherein the ski boot includes a sole with a tread surface having a recess adapted to encircle said binding mechanism and movable catch members supported on said ski boot within said recess and having on one side thereof a shaped catch receptacle surface for mating engagement with said latch members and an abutment formation on an opposite side thereof,

an actuating mechanism within said ski boot for at least one

of said movable catch members, said actuating mechanism comprising,

a movable abutment member selectively in abutment relationship with said abutment formation,

first force transmitting means for urging said abutment member in a position of abutment between said abutment member and said abutment formation of said catch member in which said catch member is locked in a first position in latching engagement relationship with one of said spring biased latch members,

second force transmitting means for withdrawing said abutment member from said first position thereof to allow said catch member to move away from said first position thereof out of latching engagement with said spring biased latch members,

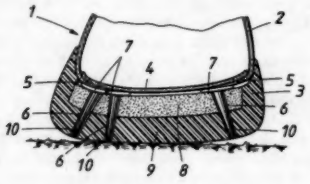
a control action element arranged on said ski boot in a position accessible from the outside and

transmission means for transmitting control action from said control action element to said actuating mechanism.

4,715,133
GOLF SHOE

Rudolf Hartjes, Neuhofen 12, A-4910 Ried/Innkreis, Austria, and Günter Gräber, Klosterstrasse 4, D-6732 Edenkoben, Fed. Rep. of Germany

Filed Jun. 13, 1986, Ser. No. 874,229
Claims priority, application Austria, Jun. 18, 1985, 1803/85
Int. Cl.[4] A43B 5/00; A43C 15/00
U.S. Cl. 36—127 **5 Claims**



1. A golf shoe comprising

(a) an outsole defining a plurality of through holes,

(b) an resilient abutment disposed on top of the outsole and covering said through holes, the resilient abutment defining a like plurality of through holes in alignment with the through holes in the outsole,

(c) a like plurality of spikes, each of which comprises

(1) a pressure-applying plate bearing on said abutment from above and

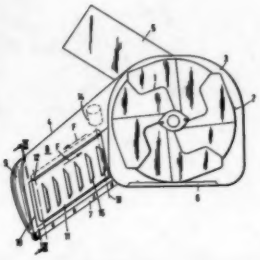
(2) a shank depending from said plate and extending through respective ones of said aligned through holes in the abutment and outsole, and

(d) an insole disposed on top said abutment, the pressure-applying plates of the spikes being disposed between the abutment and the insole, and the plates conforming to adjacent portions of the insole whereby said spikes are movable between a generally retracted position, in which said spikes do not substantially protrude below said outsole when a golfer is walking in said shoe, and an extended position, in which localized pressure upon respective ones of the adjacent insole portions causes respective ones of the pressure-applying plates to depress the resilient abutment and to move respective ones of the spikes axially through the aligned through holes so that at least certain of said spikes project below said outsole when the golfer performs a swinging motion.

4,715,134
ROTARY SNOW PLOUGH

Alfred Schmidt, Bernau, Fed. Rep. of Germany, assignor to Ing. Alfred Schmidt GmbH, St. Blasien, Fed. Rep. of Germany

Filed Jan. 24, 1985, Ser. No. 694,657
Claims priority, application Fed. Rep. of Germany, Feb. 10, 1984, 3404847
Int. Cl.[4] E01H 5/09
U.S. Cl. 37—238 **7 Claims**

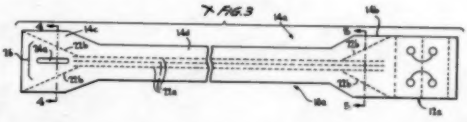


1. A rotary snow plow with at least one rotary element, a housing, a feed plough having a ploughshare attached to a side of the housing in order to increase the intake of snow with respect to a ground surface, the ploughshare of the feed plough including a belt conveyor element arranged laterally of the rotary plough, the plane of said belt conveyor element being parallel to the plane of the ploughshare and is set oblique to the ground surface so that the rear side of the ploughshare, in the direction of travel, forms an acute angle with the ground surface; and wherein the belt conveyor element is oriented with its conveying direction towards or above the rotational axis of the rotary element said ploughshare having an aperture said belt conveyor being installed in said aperture.

4,715,135
LONGITUDINALLY REINFORCED DISPLAY TAG FOR PRODUCT INFORMATION

Jacob Fast, 7561 NW. 9th St., Plantation, Fla. 33317

Filed Jun. 19, 1986, Ser. No. 876,167
Int. Cl.[4] G09F 1/00
U.S. Cl. 40—10 R **9 Claims**

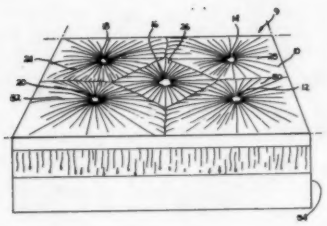


1. An elongated product information and display tag blank of plastic sheet having a mounting portion for releasably securing the blank at a proximal end of a horizontally extending support hook or the like, a substantially flat elongate portion adjacent the mounting portion for extending over the hook to present product information at a distal end thereof and lengthwise strengthening means extending at least along the elongate portion of the blank for promoting transverse flexure of the elongate portion into a bowed congfiguration when the elongate portion is, squeezed laterally there by reinforcing the blank against longitudinal flexure.

4,715,136
METHOD AND APPARATUS FOR CREATING A KINETIC WATER DISPLAY

Mark W. Fuller, Los Angeles, and Alan S. Robinson, El Monte, both of Calif., assignors to Wet Enterprises, Inc., Burbank, Calif.

Filed Sep. 9, 1986, Ser. No. 905,698
Int. Cl.[4] G09F *19/00*
U.S. Cl. 40—406 28 Claims



1. An apparatus for creating a kinetic water display effect, said apparatus comprising:

means for generating at least one stream of water in a first direction;

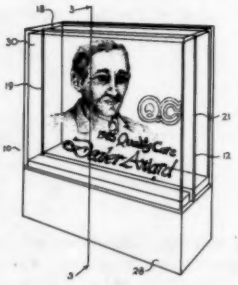
transparent plate means having inner and outer surfaces, said plate means being disposed at a substantial angle and in opposing relationship to said first direction of said at least one stream of water, said plate means being disposed across said means for generating said at least one stream of water such that said stream impinges upon the inner surface of said plate means thereby forming at least one kinetic shape comprised of ambient air and said water upon said inner surface of said plate means;

whereby an aesthetically pleasing kinetic water display viewable from a location above said outer surface of said transparent plate means is achieved.

4,715,137
ILLUMINATED DISPLAY WITH BEADED LIGHT-TRANSMITTING IMAGE

William J. Scheve, N5 W31797 Shagbark Glen, Delafield, Wis. 53018

Filed Jan. 31, 1986, Ser. No. 825,026
Int. Cl.[4] G09F *13/18*
U.S. Cl. 40—546 14 Claims



1. An illuminated display, comprising:

a light-transmitting member having at least one face;

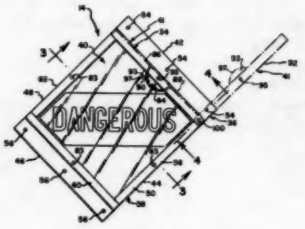
a light source adjacent to the light-transmitting member;

an image applied to the face of the light-transmitting member comprising a layer of light-transmitting adhesive in the shape of the image adhered to the face and a plurality of light-transmitting particles adhered to the adhesive, whereby, when the light source is lit, the image appears to be brighter than the rest of the member.

4,715,138
PLACARD HOLDER

John R. Cherico, Buffalo, N.Y., assignor to Johnny Stopper Inc., Cheektowaga, N.Y.

Continuation-in-part of Ser. No. 781,269, Sep. 30, 1985, abandoned. This application Nov. 1, 1985, Ser. No. 793,902
Int. Cl.[4] G09F *21/04*
U.S. Cl. 40—591 22 Claims



1. A placard holder comprising:

means defining a rigid base sheet;

means providing a rigid transparent panel arranged in spaced and parallel relationship with said base sheet; and

frame means connected between said panel and said base sheet for supporting said panel in spaced relationship with said base sheet, said base sheet, panel and said frame means collectively defining a relatively narrow, open-ended receptacle for holding a plurality of placards, said receptacle defining an opening at the open end thereof permitting the passing of placards into and out of said receptacle, said panel includes one edge extending along said receptacle opening and said one edge defining a notch facilitating the removal of placards from and the interchanging of placards within said receptacle, said frame means including at least one elongated member having a securement portion secured to said base sheet and a holding portion to which said transparent panel is secured, said holding portion being a first unitary structure and said securement portion being a second unitary structure including a thin strip portion and means defining a pair of parallel guide tracks, said thin strip portion extending along the length of said elongated member and defining two opposite edges and a planar surface engaging said base sheet, said parallel guide tracks joined to a corresponding edge of said thin strip portion and directed generally from the side of said thin strip portion opposite said planar surface, and said holding portion includes means interlocked with said pair of guide tracks so that said holding portion and said securement portion are cooperatively interlocked with one another.

4,715,139
CLOSED BREECH MUZZLE LOADER AND LOADING TOOL

Frederick W. Rodney, Jr., 134 Flagg Rd., Rochester, N.H. 03867

Filed Mar. 3, 1987, Ser. No. 21,174
Int. Cl.[4] F41C *11/00*
U.S. Cl. 42—51 8 Claims

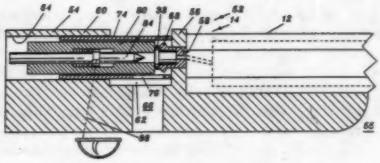
1. In a muzzle loader having a barrel with a breech end, an improved breech assembly comprising:

(a) a breech block member adapted to be fitted into a gunstock and to receive the barrel in combination with the gunstock, said breech block member including a first bulkhead disposed over the breech end of the barrel, said first bulkhead having a first bore therein having an axis parallel to the axis of the barrel, said breech block member

further including a second bulkhead spaced from said first bulkhead to create a space therebetween, said second bulkhead having a second bore therein in axial alignment with said first bore, said breech block member additionally including a vertically disposed chimney bore communicating between the bottom of said space and the outside atmosphere;

(b) a nipple member disposed in said first bore, said nipple member having a third bore therein having an axis parallel to the axis of the barrel and facing into said space, said third bore being sized to releasably receive a percussion cap therein, said nipple member further having a fourth bore therein communicating between the bottom of said third bore and the interior of the barrel at the breech end thereof whereby a percussion cap detonated in said third bore will in turn detonate gunpowder disposed in the barrel;

(c) a cylindrical sliding sleeve disposed within said second bore, said sliding sleeve being slidable between a closed position against said first bulkhead to cover said space and



said nipple member and a retracted position spaced from said first bulkhead to expose said space and said nipple member, said sliding sleeve having means in the sidewalls thereof for the passage of gases therethrough from said nipple member to said chimney bore when said sliding sleeve is in said closed position;

(d) a cylindrical firing pin assembly disposed within said sliding sleeve, said firing pin assembly being slidable between a closed position close adjacent said nipple member and a retracted position spaced from said nipple member to expose said nipple member, said firing pin assembly having an axial fifth bore therethrough and including a firing pin slidably disposed within said fifth bore and spring bias means for urging said firing pin towards said nipple member; and,

(e) trigger means disposed in said breech block member for holding said firing pin retracted from said nipple member against the bias force of said spring bias means and for releasing said firing pin to move towards said nipple member from the bias force of said spring bias means.

4,715,140

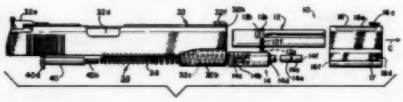
COMPENSATOR FOR HANDGUNS AND THE LIKE

Fred Rosenwald, 148 W. Julianna Dr., Churchville, Pa. 18966

Continuation-in-part of Ser. No. 787,157, Oct. 15, 1985, abandoned. This application Mar. 17, 1987, Ser. No. 26,733

Int. Cl.[4] F41C *21/18*; F41F *17/12*

U.S. Cl. 42—97 **8 Claims**



1. A compensator assembly for a handgun comprising a barrel, a slide surrounding and reciprocally movable relative to said barrel, a spring return system including a spring whose forward end extends at least partially into a lower opening in said slide, said compensator assembly comprising:

a hollow bushing having a rearward portion extending into and releaseably coupled to said slide and surrounding and slidably receiving the forward portion of said barrel;

a spring guide rod for said spring return system extending through the lower opening in said slide and through said spring;

projection means on said bushing extending towards said spring guide rod;

said barrel having a projection;

means slidably mounted on said guide rod and engaging said bushing projection means and said spring for charging said spring to normally urge one end of the guide rod into engagement with said barrel projection;

a compensator weight having an upper bore slidably receiving the forward end of said bushing and having a lower bore receiving the forward end of said guide rod; and

fastening means for securing said compensator weight to said guide rod to prevent said guide rod and compensator weight from experiencing linear movement relative to one another, said projection means preventing rotational movement of said bushing and holding said slidably mounted means in a position to preload said spring.

4,715,141

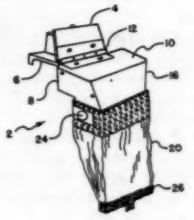
SPENT CARTRIDGE COLLECTOR

William M. Kohnke, 1170 Garraty Rd., San Antonio, Tex. 78209

Continuation of Ser. No. 816,653, Jan. 6, 1986, abandoned. This application Oct. 17, 1986, Ser. No. 919,600

Int. Cl.[4] F41C *27/00*

U.S. Cl. 42—98 **1 Claim**



1. A spent cartridge collector for receiving and collecting empty shell casings ejected through a cartridge ejection port in the wall of a firearm comprising:

a mounting unit for securing said spent cartridge collector to a firearm,

a deflector assembly affixed to said mounting unit and having an inlet port enveloping said cartridge ejection port of said firearm, an outlet port, a top surface, a front surface and a rear surface,

said inlet port being substantially larger than said cartridge ejection port and being asymmetrically positioned with respect to said mounting unit and said cartridge ejection port to extend beyond said ejection port in a direction towards the muzzle of said firearm and provide an internal volume in said deflector assembly forward of said ejection port,

said deflector assembly being hinged to said mounting unit above said cartridge ejection port to permit inspection of said cartridge ejection port of said firearm, and having said outlet port substantially orthogonal to said inlet port,

said deflector assembly being formed of sheet metal and having a planar part of said top surface inclined downwardly to redirect shell casings entering said inlet port towards said output port,

said deflector assembly having a planar part of said front surface aligned substantially perpendicular to said cartridge ejection port and inclined rearwardly towards the butt end of said firearm to redirect shell casings impinging thereon towards said butt end of said firearm and permit

operation of said firearm by left-handed marksmen with said cartridge collector mounted thereon,

and a cartridge collection bag affixed to said outlet port of said deflector assembly,

said bag having a pair of Velcro strips affixed to the bottom thereof for opening said bag to remove collected shell casings from said bag.

4,715,142

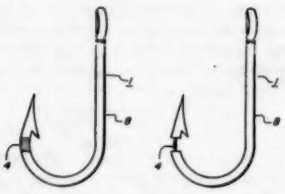
SELF-DESTRUCT FISH HOOK

Joseph D. Richard, 531 S. Navy Blvd., Pensacola, Fla. 32507

Filed May 7, 1987, Ser. No. 46,702

Int. Cl.[4] A01K *97/02*

U.S. Cl. 43—43.16 **11 Claims**



7. A self-destruct fish hook of the character described comprising;

a fish hook having a predominantly steel body and conventional shape;

a cathode covering a substantial portion of the surface of said fish hook, said cathode comprising a metal coating substantially noble galvanically with respect to the steel body of said hook;

an anodic area including a relatively smaller portion of the surface of said fish hook separate from said cathode which is active galvanically with respect to said cathode; and

means for delaying the onset of corrosion of the steel body of said hook beneath said anodic area after said hook is immersed in seawater; whereby

said cathode and the steel body of said hook beneath said anodic area eventually form a galvanic couple after a period of immersion in seawater.

4,715,143

ARTIFICIAL SEED COAT FOR BOTANIC SEED ANALOGS

M. Keith Redenbaugh, Davis, and Zoila Reyes, Menlo Park, both of Calif., assignors to Plant Genetics, Inc., Davis, Calif.

Continuation of Ser. No. 570,611, Jan. 13, 1984, abandoned, which is a continuation-in-part of Ser. No. 545,678, Oct. 25, 1983, Pat. No. 4,583,320, which is a continuation-in-part of Ser. No. 433,688, Oct. 12, 1982, Pat. No. 4,562,663. This application Apr. 24, 1986, Ser. No. 794,626

The portion of the term of this patent subsequent to Jan. 7, 2003, has been disclaimed.

Int. Cl.[4] A01C *1/06*; A01G *9/10*

U.S. Cl. 47—57.6 **14 Claims**

1. A membrane coated hydrogel capsule encapsulating meristematic tissue and separating said tissue from its environment, which comprises:

a hydrogel capsule which contains encapsulated meristematic tissue substantially free of intact seed coat; and

at least one membrane coating surrounding the capsule which reduces the flow of solvents and their included solutes between the capsule and its environment, thereby creating an analog to natural botanic seed having an artificial seed coat which provides the benefits of natural seed coat.

4,715,144

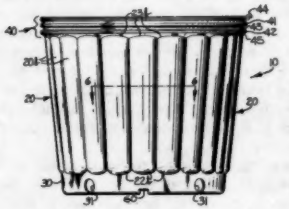
PLANT CONTAINER WITH CONCAVOCONVEX RIBS

Norman C. Lee, Greensboro, N.C., assignor to Zarn, Inc., Reidsville, N.C.

Filed Mar. 7, 1986, Ser. No. 837,501

Int. Cl.[4] A01G *9/02*

U.S. Cl. 47—66 **7 Claims**



1. A container for planting and growing plants in soil medium consisting of a unitary body forming a substantially frusto conical cylinder of thin, molded plastic material comprising:

a sidewall portion comprising substantially vertically extending circumferentially arranged elongate concavoconvex ribs with the concave areas of said ribs facing inwardly toward the center axis of the plant container and the convex areas of said ribs facing outwardly away from the center axis of the plant container, said concavoconvex ribs decreasing in width as they extend from the top to the bottom of the container,

a circumferentially extending rim portion comprising a circumferentially extending upper rib and lower rib, and a third intermediate rib, said upper and lower ribs both opening toward the inside of the plant container, and the intermediate rib opening toward the outside of the plant container, said rim portion also including a lip comprising an annular extension extending outwardly and upwardly and inwardly from said upper rib and forming a smooth uppermost edge,

a circumferentially extending transition portion extending inwardly and downwardly from said lower rib and connecting the rim portion with the sidewall portion of said plant container,

a circumferentially extending base portion contiguous with the lower end of said sidewall portion, said base portion having a plurality of drain openings, and

a bottom wall portion integral with said base portion and comprising a substantially flat bottom wall for support of said plant container.

4,715,145

LOCK-UP CONTROL FOR SHOCKLESS GEAR SHIFTING

Hitoshi Takeda, and Sadao Takase, both of Yokohama, Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed May 31, 1985, Ser. No. 739,854

Claims priority, application Japan, Jun. 1, 1984, 59-110676

Int. Cl.[4] B60K *41/22*

U.S. Cl. 74—731 **6 Claims**

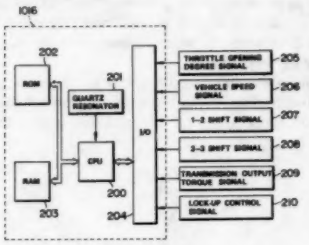
1. A lock-up control system for a lock-up type automatic transmission including a torque converter with a lock-up clutch, comprising:

means for detecting the occurrence of a command for shifting the transmission and generating a shifting command signal;

means for detecting output torque of the transmission and generating a transmission output torque signal indicative of the output torque of the transmission; and

means for determining and storing signals indicative of variations in said output torque signal and interrupting the lock-up action of the torque converter based on said trans-

mission output torque signal by releasing the engagement of the lock-up clutch after said transmission output torque



signal has demonstrated a predetermined trend in said variations after generation of said shifting command signal.

4,715,146

APPARATUS FOR CLOSING FIREPROOF DOORS

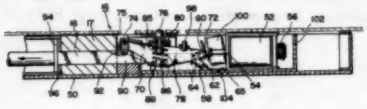
Haruyuki Atsumi, Kanagawa; Hisatugu Anzai, Tokyo, and Noboru Kasahara, Hiroshima, all of Japan, assignors to Ryobi Limited, Hiroshima and Hochiki Corporation, Shinagawa, both of, Japan

Continuation of Ser. No. 645,921, Aug. 30, 1984. This application Aug. 1, 1986, Ser. No. 894,449

Claims priority, application Japan, Sep. 8, 1983, 58-139355[U]

Int. Cl.[4] E05F *15/20*

U.S. Cl. 49—1 **8 Claims**



1. A door hold-open apparatus comprising:

a support housing adapted for attachment to a door frame;

a slider bar having a longitudinal axis and movably received in said support housing for movement therein along the slider bar longitudinal axis and adapted to be coupled to a door which is movable relative to said support housing between a door open and a door closed position, said slider bar having a first latching element;

an elongated actuator mechanism movably coupled to said support housing with its direction of elongation being substantially parallel to said longitudinal axis of the slider bar so to be tiltable about a tilt axis substantially perpendicular to the longitudinal axis of the slider bar, said actuator mechanism having a second latching element and being tiltable between a latching position in which the first and second latching elements are in releasable engagement with each other to prevent movement of the slider bar so that the door is kept in its open position and a release position in which the first and second latching elements are disengaged to release the slider bar for movement within the support housing so that the door can be closed, wherein the actuator mechanism comprises a body elongated along the longitudinal axis of said slider bar, the second latching element being disposed at one end of said body, and said member being connected to the other end of said body;

moving means secured in said support housing for moving said actuator mechanism between the latching position and the release position to disengage the first and second latching elements, said moving means comprising a solenoid and opposed, engaged surface means on said first and second latching elements angled for enabling sliding movement therebetween in a direction tangential to a locus of points defining a circle about said tilt axis of said actuator mechanism as the slider bar moves along its longitudinal axis away from the actuator mechanism to force the actuator mechanism to its said release position, said moving means further comprising a member means connected to the actuator mechanism for tilting the actuator mechanism from the latch position to the release position upon said member means being struck by a plunger of said solenoid, said member means being positioned relative to said solenoid within striking distance of the plunger of said solenoid, wherein said member comprises two linked elements having a center portion in which the two elements are rotatably coupled and two remote ends one of which is connected to the other end of said body and the other of which is connected to the support housing, said linked elements being shiftable by said solenoid between an extended position in which said one remote end is spaced a first distance from the other remote end and a collapsed position in which said one remote end is spaced a second distance shorter than the first distance from the other remote end, one of said extended and collapsed positions corresponding to the latching position of said actuator mechanism and the other corresponding to the release position of said actuator mechanism;

mounting means for tiltably coupling the actuator mechanism to the support housing for movement between said latching position and said release position, and including resilient means having a spring, coupled to the actuator mechanism for adjustably applying a resilient force opposing tilting of the actuator mechanism from said latching position to said release position, and bias adjustment means for adjusting spring tension in said spring; and

detecting means actuated by said member for sensing movement of the actuating member from said latching position to said release position and to indicate that the actuator mechanism has been displaced from the latching position.

4,715,147

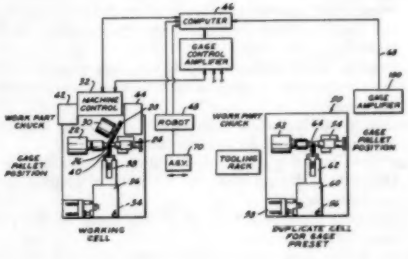
IN-PROCESS GAGING EQUIPMENT FOR FLEXIBLE GRINDING CELLS

Lawrence I. Millay, Springfield, Vt., and Edward Bourgoine, Claremont, N.H., assignors to Ex-Cell-O Corporation, Walled Lake, Mich.

Filed Oct. 1, 1986, Ser. No. 914,034

Int. Cl.[4] B24B *49/04*

U.S. Cl. 51—165.71 **5 Claims**



3. A computer numerically control changeover apparatus of in-process gaging equipment for flexible grinding cells of the type controlled by a CNC controller and having a spindle with a chuck thereon for supporting a workpiece with respect to a tail stock comprising a bench fixture which is a replica of the grinding cell including a work driver and tail stock corresponding to those on the flexible grinding cell; a master workpiece removably supported on said work driver of the bench fixture and transferable to the spindle chuck of the grinding cell along with tooling for a subsequent computer controlled grinding operation; pallet mounted in-process gage means having support features thereon; identicl coacting support

features on said bench setup fixture and said grinding cell to receive said pallet mounted in process gage means for positioning feelers thereon with respect to the master workpiece in the bench setup fixture so as to preset the gage for subsequent use in the cell; means for receiving the preset gage on the pallet for subsequent transfer to the support features on the grinding cell means; and means for automatically transferring the preset pallet mounted in-process gage from the bench setup fixture to the cell in accordance with flexible manufacturing operations conducted at the grinding cell.

4,715,148

GEM FACETING MACHINE

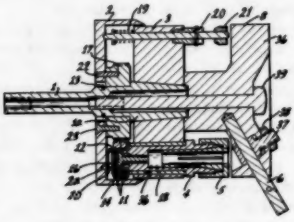
Heinrich Landgraf, Waldherrstr. 17, D-8133 Feldafing, Fed. Rep. of Germany

Filed Feb. 14, 1986, Ser. No. 830,377

Claims priority, application Fed. Rep. of Germany, Feb. 16, 1985, 3505444

Int. Cl.[4] B24B *7/22*

U.S. Cl. 51—229 **11 Claims**



1. In a gem faceting machine having a main working spindle which can be pivoted in a vertical plane to obtain various inclinations of its axes, further being amenable to height adjustment and being capable of being rotated about its own axis, there being means for latching the rotational position of the spindle in particular positions as well as in positions in-between the particular positions, a multiple gem mounting structure comprising:

a multiple chuck mounting element provided for connection to said spindle for being turned therewith, the element having a plurality of receiving bores the bores being concentrically arranged on a common circle;

a plurality of pin receiving spindles serving as chucks and respectively rotatably mounted in said bores of said multiple chuck element and being thereby radically equidistantly arranged therein;

a rotatable and position arrestable actuating element including a drive element coupled for rotation to said pin receiving spindles;

means on said actuating element for establishing a plurality of distinct latch and arresting positions;

latch and arresting means cooperating with the means for establishing, for arresting the actuating element in any of its positions;

an adaptor element for selective mounting to the chuck mounting element; and

a plurality of gem mounting pins being directly without use of the adaptor element or through an adapter element indirectly mounted to the spindles of the plurality.

4,715,149

STEADY REST FOR VALVE GRINDING APPARATUS

John R. Kelsey, 8575 Louisiana Pl., Merrillville, Ind. 46410

Filed Aug. 25, 1986, Ser. No. 900,298

Int. Cl.[4] B24B *19/00*

U.S. Cl. 51—241 VS **15 Claims**

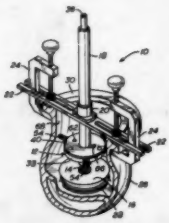
1. In flow valve seat grinding apparatus incorporating improved steady rest means, the combination comprising:

(a) a tubular drive shaft housing means which houses and supports a rotatable and longitudinally movable drive shaft means, said shaft means being connected through a flexible torque coupler means to drive a valve seat grinding head means, said grinding head means being adapted to grind a valve seat located within a valve body;

(b) said valve body being formed with an elongated cavity having a sidewall;

(c) said shaft housing means being laterally supported in movable relation within a lateral support journal means;

(d) said support journal means being connected to support



bracket means to be adjustably fixed through clamping means to the upper portion of said valve body;

(e) steady rest means including adjustable anchor means adjustably mounted within said cavity around said shaft housing means below said lateral support journal means and near said torque coupler means; and

(f) said adjustable anchor means being operable to laterally extend at least three anchor members into fixed anchoring contact with said sidewall of said valve body and thereby to receive and to laterally support said shaft housing means in fixed position within said valve body.

4,715,150

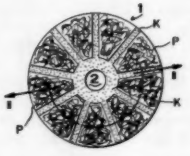
NONWOVEN FIBER ABRASIVE DISK

Masatoshi Takeuchi, and Takayasu Hamagaki, both of Tokushima, Japan, assignors to Seiken Co., Ltd., Tokushima, Japan

Filed Apr. 29, 1986, Ser. No. 857,079

Int. Cl.[4] B24D *11/00*

U.S. Cl. 51—395 **9 Claims**

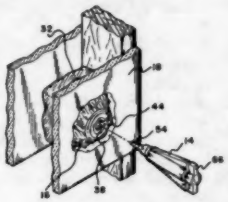


1. A nonwoven fiber abrasive disk comprising flexible fibers randomly oriented in all three dimensions and formed into a disk shape with a center hole, said disk having radial compressed regions and respective uncompressed regions between said compressed regions, said fibers being densely pressed in said compressed regions to a thickness less than in said uncompressed regions such that said compressed regions are recessed with respect to said uncompressed regions which thereby protrude out from the surface of said disk to form an abrasive surface, and wherein said compressed regions are solidified with bonding adhesive in gaps among said fibers in said compressed region.

4,715,151
PLASTERBOARD REPAIR KIT

Alvin Garblik, 407 S. Almonesson Rd., Deptford, N.J. 08096

Filed Jan. 8, 1987, Ser. No. 1,612
Int. Cl.[4] E04G 23/02
U.S. Cl. 52—2 6 Claims



1. A plasterboard repair kit for use in patching a hole in a plasterboard comprising:

an inflatable member, said member being comprised of flexible but substantially inelastic plastic and including a front wall, a rear wall and peripheral side walls, an opening in said front wall for permitting gas to be introduced into the interior of said member for inflating the same and including valve means for preventing gas from exiting from said member;

said inflatable member, when fully inflated and unrestricted by any outside structure, being substantially rectangular in shape;

said opening being formed by a structural member which extends forwardly substantially no further than the exterior surface of said front wall;

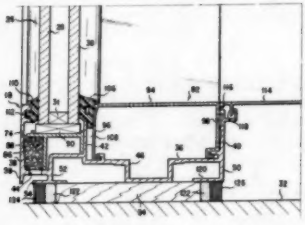
a gas cartrigde, said cartridge containing only enough gas to substantially inflate said inflatable member at room temperature, and

a holder for said cartridge, said holder including a nozzle means adapted to fit within said opening and further including means for releasing gas from said cartridge and directing the same through said nozzle so that it can enter said opening to inflate said inflatable member.

4,715,152
WATERTIGHT WINDOWSILL CONSTRUCTION

Shinji Tanikawa, Namerikawa, Japan, assignor to Yoshida Kogyo K. K., Tokyo, Japan

Filed Dec. 24, 1986, Ser. No. 946,523
Claims priority, application Japan, Dec. 25, 1985, 60-198440
Int. Cl.[4] E06B 7/14
U.S. Cl. 52—209 5 Claims



1. A fixed sash window assembly for installation in an opening in an enclosing wall of a building, the opening being defined in part by a foundation of the building having a window base immovably mounted thereon, the fixed sash window assembly comprising:

(a) panel means;

(b) frame means of generally rectangular arrangement, to be installed in the opening in the enclosing wall of the building, for receiving and holding the panel means;

(c) a sill included in the frame means and integrally comprising:

(1) a web generally disposed horizontally and having an exterior end and an interior end;

(2) an exterior flange extending upwardly from the exterior end of the web;

(3) there being a series of spaced apart drain holes defined in the web and disposed interiorly of, and along, the exterior flange;

(4) a drain shield extending downwardly from the web and disposed exteriorly of the drain holes in the web for shielding the drain holes against the backflow of water therethrough; and

(5) leg means depending from the web to be mounted directly on the window base and including an exterior leg having horizontal ledge extending exteriorly beyond the window base into underlying relation to the drain holes in the web at a distance therefrom, so that a space thus created between the horizontal ledge of the exterior leg of the leg means and the foundation of the building can be caulked by filling a sealing compound in the form of continuous strip without the possibility of blocking the drain holes in the web:

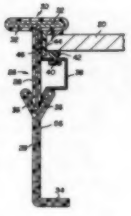
(d) an attachment mounted on the web of the sill, and disposed interiorly of the exterior flange thereof, for supporting the panel means thereon, the attachment further coacting with the sill to define a water chamber over the drain holes in the web of the sill, the water chamber being in communication with a gap between the panel means and the exterior flange of the sill; and

(e) an exterior sealing strip mounted between the panel means and the exterior flange of the sill for watertightly sealing the gap therebetween.

4,715,153
PANEL MOUNTING BUILDING WALL CONSTRUCTION

Henry Rohrman, Rochester, N.Y., assignor to Schlegel Corporation, Rochester, N.Y.

Filed May 8, 1986, Ser. No. 861,151
Int. Cl.[4] E04B 2/88
U.S. Cl. 52—213 18 Claims



1. A panel mounting building wall construction comprising:

a unitary elongate roll formed structural frame member of substantially J-shaped cross-section having a flat elongate intermediate plate member characterized by a first thickness, an elongate head, characterized by a first width, on one edge of said plate member transverse thereto and having lateral portions of said head extending outwardly in each direction away from said plate member, and an elongate laterally extending foot on the opposite edge of said plate member extending outwardly away from said plate, said foot having a width substantially equal to one half of said first width;

a pair of elongate lips on said plate member, one of said lips laterally extending from one side of said plate member and the other of said lips laterally extending from the opposite side of said plate member;

a seal assembly interposed between at least one of said lips and said head for releasably holding an edge of a wall

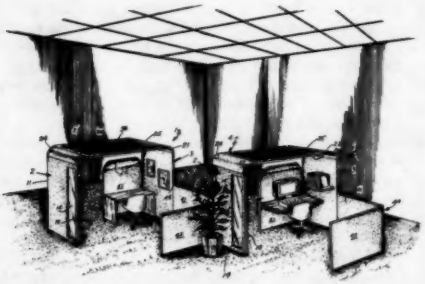
panel therebetween; and at least one transverse slot extending through the plate member and at least one flat end portion, insertable through said slot extending outwardly from said member a distance at least equal to the thickness of said member.

4,715,154

SPACE PARTITION MODULE

Mark A. Baloga, Grand Rapids, Mich., assignor to Steelcase Inc., Grand Rapids, Mich.

Filed Dec. 10, 1984, Ser. No. 680,282
Int. Cl.[4] E04H *1/00*
U.S. Cl. 52—239 **41 Claims**



1. A space partition module for subdividing an open office space in a building envelope, which is defined by a building ceiling, a building floor having a predetermined area and perimeter, and fixed building walls having a height; said space partition module comprising:

first and second sidewall panels positioned in a generally vertical, oppositely facing, spaced apart, generally parallel orientation; said first and second sidewall panels having upper edges, lower edges, and side edges, with said lower edges extending along the building floor;

a ceiling having opposite end edges connected with the upper edges of said first and second sidewall panels, and supporting said first and second sidewall panels in a free-standing condition; said ceiling panel spanning said first and second sidewall panels without any intermediate support at a height above the building floor that is less than the height of the building walls, and said first and second sidewall panels being spaced apart and arranged in a manner that defines an interior area and a perimeter which are substantially less than the area and the perimeter of the open office space in the building envelope, whereby said space partition module can be freely positioned on the building floor at any desired location;

said ceiling formig a canopy with sufficient headroom to accommodate average users, which canopy, in conjunction with said first and second sidewall panels, defines an unobstructed, three-dimensional workstation within and independent of the open office space, that has a degree of privacy for more efficient work performance, without evoking a sense of claustrophobia.

4,715,155

KEYABLE COMPOSITE JOIST

Neal E. Holtz, 11400 Rockville Pike, #750, Rockville, Md. 20852

Filed Dec. 29, 1986, Ser. No. 947,222
Int. Cl.[4] E04C *3/08*
U.S. Cl. 52—333 **14 Claims**

1. A joist for composite slab construction, comprising:

a. an open web of

i. zig-zag structure with

(1) slanted bracing members and

(2) upper and lower knuckle and

ii. open spaces between the bracing members, and

b. at least one chord united to the web to form a joist, including

i. an upper chord comprising

(1) a sealing first bar which

(a) extends longitudinally in said joist (b) and which has

(i) a longitudinal, upright first leg havng a first face which is

(1) upright and

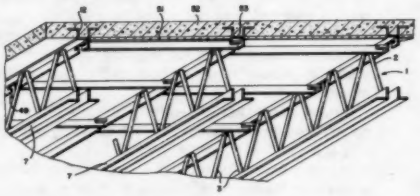
(2) confronts one side of the web

(ii) a second leg comprising plural longitudinally-spaced leg segments extending

(1) longitudinally and laterally from the first leg,

(2) into and substantially throughout the length of, open spaces extending between the bracing members and located between adjacent upper knuckles of the web, and

(2) a second bar, which



(a) extend longitudinally in said joist

(b) and includes an upright third leg having

(i) a second face which

(1) is upright

(2) confronts the other side of the web

(3) is laterally spaced from the first leg and

(4) is in closely spaced or abutting relationship with the leg segments of the first bar,

(3) said first, second and third legs and leg segments and their respective faces forming a concrete-receiving channel

(a) into which a plurality of the upper knuckles of the web extend to partition the channel into plural, longitudinally spaced pockets having open upper mouths for receiving concrete and

(b) in which the adjoining surfaces of said legs, leg segments, faces and knuckles abut with one another or are sufficiently closely spaced for forming keyed connections between said pockets and a concrete slab.

4,715,156

SUPPORT STRUCTURE FOR ROOF INSULATION IN METAL BUILDINGS

John J. Dozzo, Rio Rancho, N. Mex., assignor to Duke Insulation Company, Inc., Albuquerque, N. Mex.

Filed Sep. 2, 1986, Ser. No. 902,602
Int. Cl.[4] E04B *1/74*
U.S. Cl. 52—404 **13 Claims**

1. Support structure for supporting insulation between purlins in metal buildings, comprising, in combination:

a plurality of cross brace extending between and disposed on flanges of the purlin, each cross brace including

a first end means secured to one purlin,

a second end means secured to another purlin, and

a center portion between the first and second end portions having

a first arm,

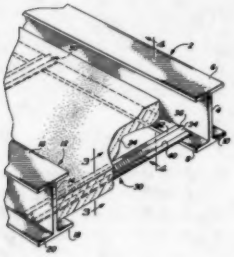
a first flange secured to the first arm and extending outwardly therefrom,

a second arm secured to the first arm,

a second flange secured to the second arm and extending outwardly therefrom and generally aligned with the first flange, and

a juncture between the first arm and the second arm defining, in a cross section of the cross brace, an apex from which the first and second arms extend; and

stringer means, including at least a single stringer secured to the plurality of cross braces between the purlins and defining with the cross braces a grid between the purlins for supporting insulation, and including



a third arm,

a third flange secured to the third arm and extending outwardly therefrom,

a fourth arm secured to the third arm,

a fourth flange secured to the fourth arm and extending outwardly therefrom and generally aligned with the third flange, and

the plurality of cross braces and the stringer are secured together at the flanges,

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4,715,157

ROOF STRUCTURE AND ROOF BOARD THEREFOR

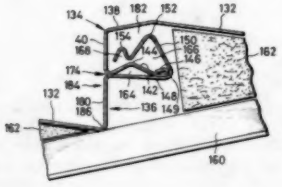
Motokatsu Funaki, 430 Shimotsuchidana, Fujisawa-shi, Kanagawa-ken, Japan

Filed Jul. 23, 1986, Ser. No. 888,603

Claims priority, application Japan, Jul. 24, 1985, 60-162133; Apr. 10, 1986, 61-81086

Int. Cl.[4] E04D *1/00*

U.S. Cl. 52—529 **12 Claims**



1. A roof board comprising:

a flat surface section, an eaves side connection formed at one end of said flat surface section, and a ridge side connection formed at the other end of said flat surface section, a plurality of said roof boards being adapted to be connected through said eaves side and ridge side connections to one another in order with an upward incline in the direction of from an eaves side to a ridge side to form a roof structure;

said eaves side connection being formed to have an upper front face section downwardly extending from said one end of said flat surface section, an inwardly extending section inwardly extending from a lower end of said upper front face section, and an engagement section formed at a distal end of said inwardly extending section;

said ridge side connection being formed to have a lower front face section upwardly extending from said the other end of said flat surface section, an outwardly extending section outwardly extending from an upper end of said lower front face section, and an envelope section formed at a distal end of said outwardly extending section;

the connection between each adjacent two of said roof boards being carried out above said ridge section by holding the engagement section of the ridge side one of said adjacent two roof boards in the envelope section of the eaves side one of said adjacent two roof boards and abutting the upper end of the lower front face section of said eaves side roof board against the eaves side connection of said ridge side roof board to form a butt region therebetween which is positioned upwardly apart from the flat surface section of said eaves side roof board and exposed to an exterior of said roof structure.

4,715,158

MODULAR ELEMENT PARTICULARLY FOR FALSE CEILINGS, PARTITION SURFACES AND NON-STRUCTURAL WALLS

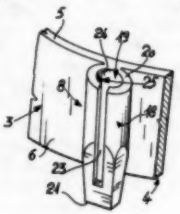
Giorgio Manzelli, Via S. Gallo 18, Lido Di Venezia (Province of Venezia), Italy

Filed Jun. 9, 1986, Ser. No. 872,331

Claims priority, application Italy, Jun. 14, 1985, 30725/85[U]

Int. Cl.[4] E04C *2/42*

U.S. Cl. 52—581 **8 Claims**



1. A modular element, particularly for equipping false ceilings, partition surfaces and non-structural walls, comprising a main body defining a first and a second main body bases, opposed to each other, and an outer side surface extending between said main body bases, a pair of male connection elements and a correspondent pair of female connection elements protruding from said outer side surface at mutually opposed locations thereof, each of said male connection elements comprising a ribbing extending from said outer side surface between said main body bases and having, on an edge thereof opposite to said outer side surface, an enlarged portion having an engagement end surface facing said first main body base, defining a transverse dimension and and extending at a first distance from said second main body base, each of said female connection elements comprising a sustantially tubular lug protruding from said outer side surface between said main body bases, said lug having an open end portion facing said first base and an internal cavity extending from said open end portion through said lug, said internal cavity being substantially countershaped to said enlarged portion, said lug further having a longitudinal slit extending at a lateral side of said lug opposed to said outer side surface and communicating with said cavity and stop projections extending in said internal cavity at a second distance from said second main body base which is greater than said first distance, said stop projections defining a mutual distance which is smaller than said transverse dimension, thereby, after insertion of said enlarged portion of said male connection element in an internal cavity of a female connection element of adjacent modular elements, the stop

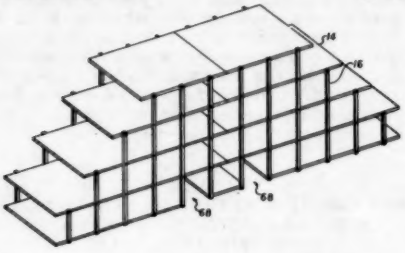
projections of the female connection element of the adjacent modular elements cooperating with said engagement end surface of said enlarged portion and securely retaining said enlarged portion in the internal cavity.

4,715,159

COLLAPSIBLE BUILDING CONSTRUCTION SYSTEM

Yousef Hijazi, P.O. Box 2, Makkah, Saudi Arabia

Filed Oct. 7, 1986, Ser. No. 916,380
Int. Cl.⁴ E04H *12/18*
U.S. Cl. 52—646 **23 Claims**



1. A collapsible building construction system comprising:

a plurality of horizontally disposed floor slabs which are adapted for stacking one on top of the other in a collapsed storage position and which are adapted to assume a spaced parallel relationship with each other when placed in an opened position,

pivotal columns for connecting the horizontally disposed floor slabs to the adjacent floor slabs, the pivotal columns connected to the floor slabs at pivot points to provide for a scissor-like movement between the floor slabs and the pivotal columns,

removable partitions that divide the space between floor slabs into rooms comprising foldable panels stored in compartments in the floor slabs which are removed from the compartments and locked in place, and

means for bracing the floor slabs and the pivotal columns in the opened position.

4,715,160

SET OF STANDARDIZED STRUCTURAL ELEMENTS AND ACCESSORIES FOR THE ACCOMPLISHMENT OF SPATIAL AND/OR FLAT STRUCTURES WHICH CAN BE COMBINED TO DELIMIT HABITABLE SPACES IN AN INDUSTRIALIZED BUILDING SYSTEM

Luciano Romanelli, (Bari), Trani Strada Statale N. 16-Km. 762, Italy (70059)

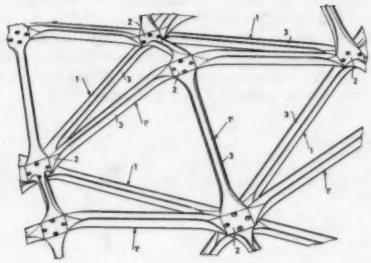
Filed Apr. 18, 1986, Ser. No. 853,401
Claims priority, application Italy, Apr. 24, 1985, 20465 A/85
Int. Cl.⁴ E04H *12/00*
U.S. Cl. 52—648 **16 Claims**

1. A set of standardized structural elements and accessories for the construction of building structures comprising:

a first plurality of variable-section rod elements made up of aligned equally spaced flat pads and aligned pad connecting straight section lengths said straight section lengths having a non-planar cross-section, said variable-section rod elements being combinable with each other to form a planar reticular structure, each variable-section rod element having a longitudinal axis;

a second plurality of discontinuous variable-section rod elements made up of parallel equally spaced flat pads and alternately inclined pad connecting straight section lengths said straight section lengths having a non-planar cross-section, said discontinuous, variable-section rod elements being combinable with each other and with said variable-section rod elements to form a spatial reticular structure, each discontinuous variable-section rod element having a longitudinal axis; and

a third plurality of panels, said panels being square with a side length equal to a multiple of the distance between



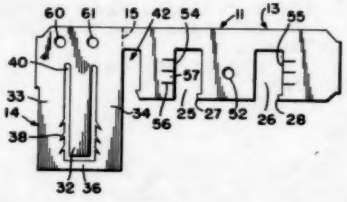
successive pads of said variable-section rod elements, said panels being combinable with and superimposable upon said variable-section rod elements to form a continuous surface for said spatial reticular structure.

4,715,161

SUSPENDED CEILING GRID CLIP

Eugene Carraro, Roslyn Heights, N.Y., and Raymond S. Laughlin, Cuyahoga Falls, Ohio, assignors to Erico International Corporation, Solon, Ohio

Filed May 19, 1986, Ser. No. 864,324
Int. Cl.⁴ E04B *5/52*
U.S. Cl. 52—714 **17 Claims**



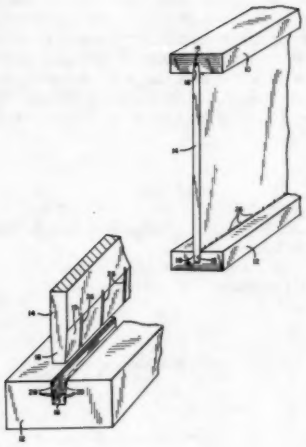
1. A spring steel fastener for suspended ceiling grids including tee bars, angles and the like, comprising a horizontal portion and a vertical portion connected to said horizontal portion at one end thereof, said vertical portion being offset at an angle to said horizontal portion, said horizontal portion including means for resiliently gripping and releasing the bulb of the stem of a tee bar, said vertical portion including means for gripping and releasing the upturned edge of an angle and means for gripping and releasing the bulb of a stem of a tee bar, said vertical portion being essentially planar and including a downwardly projecting spring tab in such plane, and a downwardly extending spring tab offset from such plane with the upturned edge of such angle adapted to be grasped therebetween, and a notch in said horizontal portion at its connection to said vertical portion adapted to accomodate the bulb portion of said second mentioned tee bar, the upper end of said offset tab partially blocking the opening of said notch and snapping beneath the shoulder of such bulb portion when inserted in such notch.

4,715,162

WOODEN JOIST WITH WEB MEMBERS HAVING CUT TAPERED EDGES AND VENT SLOTS

Lionel L. Brightwell, Boise, Id., assignor to Trus Joist Corporation, Boise, Id.

Filed Jan. 6, 1986, Ser. No. 816,568
Int. Cl.[4] E04C *3/12*
U.S. Cl. 52—729 9 Claims



1. A wooden structural member, comprising:

a pair of spaced wooden flanges each having a groove extending longitudinally thereof in alignment with and facing the groove of the other flange, said groove being tapered in width and of substantially uniform cross section along at least the majority of its length;

adhesive bonding material provided in uncompressed wood within said grooves;

a wooden web of oriented strand board having two opposite edges secured within the grooves of said flanges by the adhesive bonding material, said opposite edges each being cut with a tapered width which reduces with distance toward an outer end of the tapered edge and formed of substantially uncompressed wood which is not compressed beyond its elastic limit; and

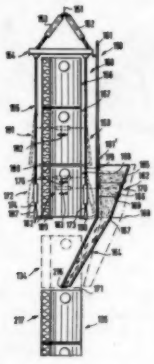
vent slots spaced longitudinally along the grooves and provided in uncompressed wood between the mating surfaces of the web edge and the flange groove, said vent slots extending to the top of the grooves to allow said bonding material to vent out of said grooves through said vent slots.

4,715,163

APPARATUS FOR MORTARING LARGE-FORMAT BRICKS INTO A WALL

Lorenz Kesting, Holzheck 21, 4600 Dortmund-Eving, Fed. Rep. of Germany

Filed May 28, 1985, Ser. No. 737,740
Claims priority, application Fed. Rep. of Germany, Feb. 20, 1985, 3505841
Int. Cl.[4] E04G *21/22*
U.S. Cl. 52—749 19 Claims



1. An apparatus for mortaring large format bricks into a wall, said apparatus including:

a frame suitable for being lifting above the wall;

a magazine (155) mounted on said frame for receiving a vertical stack of at least two bricks (156-158);

lower and upper manipulator means (172, 191, 306, 317) in said magazine for releaseably engaging the lowest brick of said stack within said magazine and the next lowest brick of said stack within said magazine, respectively, for retaining the bricks against vertical movement in the magazine when so engaged; and

operating mean for said lower and upper manipulator means for cyclically operating said manipulator means to cause said lower manipoulator means to engage said lowest brick in said stack, to cause said lower manipulator means to release said lowest brick to vertically, downwardly discharge said lowest brick from the bottom of the magazine onto said wall while said upper manipulator means engages said next lowest brick, to cause said upper manipulator means to release said next lowest brick to obtain downward movement of said next lowest brick in said magazine to become the lowest brick in said magazine, and to thereafter cause said lower manipulator means to engage the lowest brick to retain the lowest brick in said magazine.

4,715,164

HIGH SPEED ENVELOPE FLAP OPENER

Harry E. Luperti, Bethel; Eric N. Person, Danbury, and Thomas Simmel, Milford, all of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.

Filed Feb. 28, 1986, Ser. No. 835,000
Int. Cl.[4] B65B *43/26*
U.S. Cl. 53—381 R 5 Claims

1. In a device for handling articles each of which has a bent-over flap, apparatus for conditioning the flap, comprising:

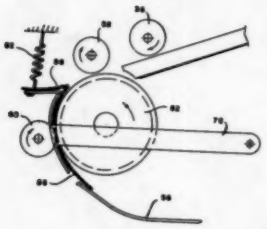
a transfer roller rotatably driven mounted on a frame;

a first rotatably mounted pressure roller abuttingly disposed against said transfer roller and providing between itself and said transfer roller a first nip for receiving an article having a bent-over flap;

a second pressure roller abuttingly disposed against said

transfer roller, said second pressure roller being spaced from said first pressure roller about the periphery of said transfer roller and providing between itself and said transfer roller a second nip for receiving the article; and

a pivotable flap-opening means for receiving the article from the first nip, said pivotable flap-opening means being arcuately shaped and having a flap-engaging lip thereon, said pivotably flap-opening means being dynamically pivotable between a first position for receiving the article between itself and the transfer roller and a second positon for guiding the article about said transfer roller to the



second nip, wherein the first pressure roller is arranged with respect to said flap-opening means such that the article flexes in a direction opposite from the curvature of the transfer roller as the article exits the first nip and is guided to the second nip, and wherein the flap-engaging lip on said pivotable flap-opening means is arranged for engaging the flap of said article as said pivotable flap-opening means is guiding the article about said transfer roller whereby the flap is opened and bent back by the engagement of the flap with the lip as the article is guided past the lip through the second nip.

4,715,165

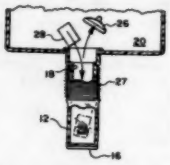
METHOD AND APPARATUS FOR REMOVAL OF ITEMS FROM A STERILE ENCLOSURE

Douglas E. Thorogood, Tervuren, Belgium, assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Continuation of Ser. No. 806,075, Dec. 5, 1985, abandoned. This application Apr. 1, 1987, Ser. No. 32,912

Int. Cl.[4] B65B *5/00*

U.S. Cl. 53—469 **3 Claims**



1. A method for maintaining sterility of a sterile item during the removal of the sterile item from a sterile enclosure having a port which leads from the interior of the sterile enclosure to the outside environment, the port having a proximal end adjacent to the interior of the enclosure and a distal end outside of the enclosure and the sterile enclosure including means for closing the port to provide a closed sterile environment, the method comprising the steps of:

(a) providing a length of flexible packaging having an open proximal end, a closed distal end and a sterile interior;

(b) attaching the proximal end of the packaging to the port of the enclosure on the outside of the enclosure and adjacent to the proximal end of the port;

(c) compressing the length of packaging and moving a substantial portion of the packaging including the distal end of the packaging adjacent to the distal end of the port;

(d) opening the means for closing the port to define a closed sterile environment comprising the sterile enclosure and sterile interior of the sterile length of packing;

(e) passing the sterile item from the interior of the sterile enclosure through the port into the interior of the packaging adjacent to the distal end of the packaging;

(f) sealing a substantially transverse area of the packaging at a location between the position of the sterile item at the distal end of the packaging and the proximal end of the packaging, whereby the sterile item is sealed in a segment of the packaging at the distal end of the packaging;

(g) cutting the packaging substantially transversely along the sealed area whereby the sterile item in the sealed segment of the packaging is separated from the remaining length of packaging; and wherein

(h) the step of sealing a substantially transverse area of the packaging comprises making the sealed area wide enough whereby, when the packaging is cut substantially transversely along the sealed area, a portion of the sealed area lies on the separated segment of packaging and another portion of the sealed area lies on the remaining length of packaging, the sterile enclosure and sterile interior of the remaining length of packaging defining a closed sterile environment.

4,715,166

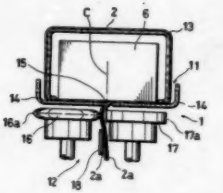
FILM PACKAGING APPARATUS

Hiroshi Kameda, Sakai, Japan, assignor to Tokiwa Kogyo Co., Ltd., Osaka, Japan

Filed Jan. 7, 1987, Ser. No. 1,194

Int. Cl.[4] B65B *9/06, 51/14, 51/16, 51/26*

U.S. Cl. 53—550 **9 Claims**



1. A film packaging apparatus comprising:

a tube former to which is supplied a continuous length of a heat-meltable, heat-shrinkable film having a pair of longitudinal margins and to which is also supplied a plurality of articles to be packaged;

said former including an inner former member on which said film is wrapped with said margins overlapping each other;

said former further including an outer former member having a longitudinal outlet through which said overlapping margins project out;

a longitudinal sealer disposed outside said tube former adjacent to said outlet for longitudinally heat-sealing and cutting said overlapping margins;

said sealer including a cutter disc having a rounded circumferential edge, and a counter disc having a flat circumferential surface substantially in contact with said circumferential edge;

said margins being nipped between said cutter disc and said counter disc at a position slightly deviating toward said cutter disc from a center line of said longitudinal outlet;

a film guide for directing toward said center line portions of said margins located farther from said tube former than said position of nipping; and

a transverse sealer disposed behind said longitudinal sealer for transversely heat-sealing and cutting a continuous tube of said film at a position between each adjacent two of said

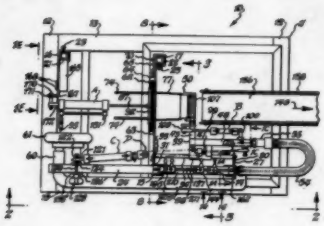
articles to provide a bag of said film completely enclosing each of said articles.

4,715,167

BAGGER MACHINE

James G. Savigny, Lockport, N.Y., assignor to Ag-Pak, Inc., Gasport, N.Y.

Filed Aug. 8, 1986, Ser. No. 894,616
Int. Cl.[4] B65B *43/28*
U.S. Cl. 53—572 **25 Claims**



1. A bagger comprising a frame, a wicket bar having a front side and a rear side on said frame for mounting a ream of bags each having a front side and a rear side with said front sides of said bags facing said rear side of said wicket bar, said bags also having tabs at the upper ends of said rear sides, a rear clamp cylinder including a rear clamp piston rod, a rear clamp plate on said rear clamp piston rod for movement toward said wicket bar with said rear clamp piston rod to press against said tabs of said bags, a carriage, means mounting said carriage on said frame for movement toward and away from said wicket bar, a suction head on said carriage, means for creating a suction in said suction head, a bag opening cylinder mounted between said frame and said carriage for moving said carriage and said suction head thereon toward said ream on said wicket bar to engage the front side of the outermost bag on said ream and apply suction thereto and for moving said suction head away from said ream to pull the front side of said outermost bag away from the rear side thereof which is held on said wicket bar, a front clamp cylinder, means mounting said front clamp cylinder on said carriage, a front clamp piston rod on said front clamp cylinder, a clamp member on said carriage coupled to said front clamp piston rod, means mounting said clamp member for movement toward and away from said suction head to selectively clamp said upper edge portion of said front side of said bag after it has been moved away from said wicket bar and to selectively release said upper edge portion of said front side of said bag, and a bag push cylinder effectively mounted between said frame and said carriage for pushing said outermost bag away from said wicket bar while said front upper edge portion is effectively clamped between said suction head and said clamp member.

4,715,168

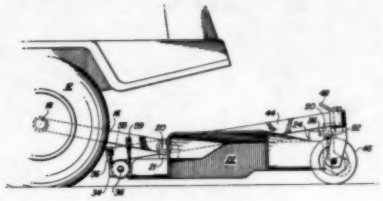
HEIGHT ADJUSTMENT FOR A FRONT MOUNT MOWER

Lonnie R. Oxley, West Bend, Wis., assignor to Deere & Company, Moline, Ill.

Filed May 13, 1986, Ser. No. 862,862
Int. Cl.[4] A01D *34/04, 34/64*
U.S. Cl. 56—15.8 **4 Claims**

1. In a height adjustment device for a front mounted mower, said mower including a mower deck having the rear portion thereof supported by a pair or push arms pivotally attached to and interconnecting said mower deck and a drive vehicle, the improvement comprising:

a support frame pivotally attached to said mower deck at the point of pivotal attachment of said push arms to said mower deck, said support frame including ground engaging wheels disposed to support the forward end of said support frame, an adjustment bracket interconnecting said support frame and said mower deck and disposed to selectively engage and support the forward end of said mower deck at one of a number of vertically spaced positions, whereby the forward end of said mower deck is selectively supported on said ground engaging wheels; and



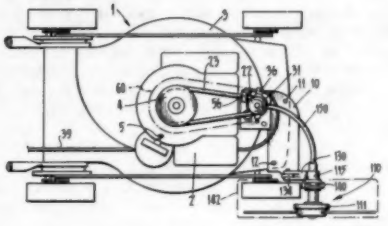
means for automatically levelling the rear portion of said mower deck with the forward end of said mower deck, said leveling means being connected to said push arms and said support frame such that said rear portion is leveled relative to the forward end for each of the vertically spaced positions of the adjustment bracket.

4,715,169

EDGING ASSEMBLY

Maxwell K. Ould, 27 Severn Street, Epping, Victoria, Australia 3076

PCT No. PCT/AU85/00208, § 371 Date May 5, 1986, § 102(e) Date May 5, 1986, PCT Pub. No. WO86/01371, PCT Pub. Date Mar. 13, 1986
PCT Filed Aug. 30, 1985, Ser. No. 871,406
Claims priority, application Australia, Sep. 6, 1984, PG6973
Int. Cl.[4] A01D *35/26*
U.S. Cl. 56—16.9 **17 Claims**

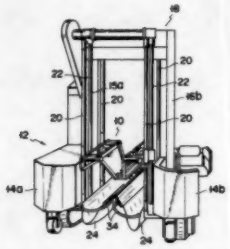


1. An edging asssembly for attachment to a rotary mower of the kind comprising a housing supporting a motor having a main shaft that drives a cutting blade below the housing to rotate about a substantially vertical axis, the assembly comprising a support plate arranged to be secured to the housing of the mower above the rotatable cutting blade, the support plate having mounted thereon an axially rotatable drive shaft, the drive shaft co-axially supporting an idler pulley and a drive pulley, a drive belt for connecting said pulleys to the main shaft of the mower, the drive shaft and pulleys being mounted on the support plate to be displaceable relative to the motor of the mower to vary the tention in the drive belt, the drive shaft being supported to be freely rotatable within a collar that is pivotably supported by the support plate, the drive belt extending past a pair of rollers positioned one on each side of the drive belt and supported on a slide which is displaceable relative to the collar to transfer the belt from one pulley to another, a cable control coupled to the slide to effect displacement of the slide, rotatable edging means supported by said plate, and a flexible spindle drive transferring drive from the drive shaft to the edging means.

4,715,170
APPARATUS FOR SELECTIVELY REMOVING TOBACCO PLANT LEAVES

Hajime Miki, Oyama, Japan, assignor to Japan Tobacco Inc., Tokyo, Japan

Filed Mar. 13, 1986, Ser. No. 839,267
Claims priority, application Japan, Mar. 18, 1985, 60-52344
Int. Cl.[4] A01D *45/16*
U.S. Cl. 56—27.5 10 Claims



1. An apparatus for plucking tobacco leaves, comprising:

means movable along one row of tobacco plants extending in a predeterminded direction said means having a pair of supporting members which can be positioned on both sides of the row of tobacco plants and extend parallel to the row of tobacco plants;

a pair of first arms pivotally connected at the upper end to the supporting members;

a pair of second arms pivotally connected at the upper end to the supporting members and spaced apart from said first arms by a predetermined distance in the directiion of said row of tobacco plants;

a pair of leaf-plucking arms, one being pivotally connected at both ends to the lower ends of the first and second arms which are connected to one of said supporting members, and the other being pivotally connected at both ends to the lower ends of the first and second arms which are connected to the other support member, said leaf-plucking arms extending parallel to each other and spaced apart, forming a gap wide enough to allow the passage of a tobacco stalk and to provide a gap between the stalk and either leaf-plucking arm;

a plurality of wheels rotatably attached to each of said leaf-plucking arms and arranged at regular intervals in the lengthwise direction of the leaf-plucking arm, each wheel having a plurality of spokes long enough to extend into the gap between said leaf-plucking arms; and

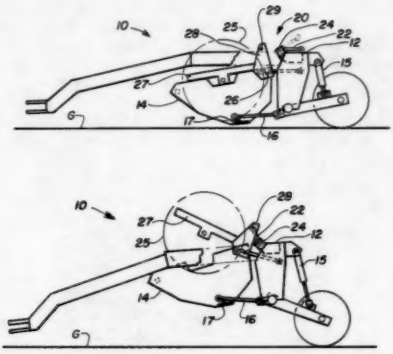
drive means for moving said first pair and said second pair of arms back and forth, to thereby move said leaf-plucking arms up and down.

4,715,171
REEL LIFT MECHANISM FOR MOWER-CONDITIONERS

Emmett F. Glass, Akron, and Edmund O. Howell, New Holland, both of Pa., assignors to New Holland Inc., New Holland, Pa.

Filed Apr. 7, 1986, Ser. No. 848,602
Int. Cl.[4] A01D *47/00, 57/04*
U.S. Cl. 56—192 7 Claims

1. In a mower-conditioner having a mobile frame adapted for movement over the ground; a header suspended forwardly of said frame for movement relative to said frame, said header including a cutterbar mounted thereon at a forward extremity of said header to sever standing crop material from the ground and crop conveying means for conveying crop material within said header including a rotatable reel, said crop conveying means being pivotally connected to said header to position said reel above said cutterbar for cooperative association therewith to harvest crop material from the ground; and header lift means for raising said header relative to said frame, the improvement comprising:

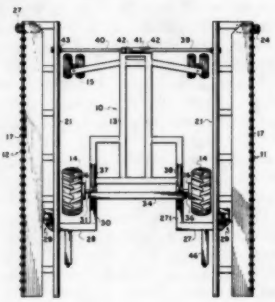


linkage means selectively interconnectable between said frame and said crop conveying means for affecting a raising of said reel relative to said cutterbar when said header lift means raises said header relative to said frame.

4,715,172
HARVESTING MACHINE WITH TWIN HEADERS

Ewen Mosby, Box 336, Hartney, Manitoba, Canada R0M 0X0

Filed Jul. 16, 1986, Ser. No. 886,176
Claims priority, application Canada, Jul. 24, 1985, 487410
Int. Cl.[4] A01D *73/00;* A01B *49/00*
U.S. Cl. 56—228 16 Claims



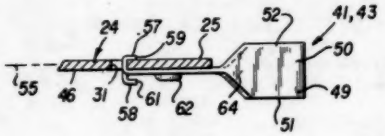
1. A machine for harvesting a standing crop comprising a frame having a front end and a pair of sides, ground wheels for supporting the frame for driving movement across a field to be harvested, a pair of headers for cutting the standing crop each including means for cutting the crop and means thereon for transporting the cut crop transversely of the direction of motion, means mounting the headers on the frame at the front end thereof such that, in a working position thereof, the headers abut at the front end and extend outwardly therefrom to respective sides of the frame, and pivot coupling means mounting at least one of said headers on said frame such that it can pivot from said working position to a transport position in which it lies along a respective side of the frame generally parallel to the direction of movement and such that as it pivots the cutting means thereof is raised upwardly and inwardly toward the frame.

4,715,173

ROTARY LAWN MOWER ACCESSORIES

James Anderson, 5445-4A Avenue, Tsawwassen, British Columbia, Canada V4M 1H6

Filed Jun. 4, 1985, Ser. No. 741,111
Int. Cl.[4] A01D 55/00
U.S. Cl. 56—295 8 Claims



1. An accessory assembly for use with a rotary lawn mower having a powered output shaft adapted to rotate about a generally vertical axis of rotation, the accessory assembly including:

(a) an elongated accessory bar adapted to be mounted on the output shaft to rotate therewith, the bar having opposite end portions, each end portion having a location opening and a positive fastener means, the fastener means and location opening of each end portion of the bar being spaced apart at a particular spacing and disposed along the bar so as to be located at different radii from the vertical axis,

(b) a pair of grass cutting elements mounted adjacent respective outer end portions of the bar, each grass cutting element having a downwardly inclined outer portion adapted to cooperate with the grass, and an inner portion having a first hook-shaped tang having an outwardly facing saddle means to engage the location opening, the tang also having a free end portion extending from the saddle means and away from the axis of rotation of the bar, each grass cutting element also having a positive fastener means spaced from the tang at the said particular spacing and cooperating with the positive fastener means of the bar to secure the cutting element positively to the accessory bar, and to provide lateral support for the cutting element to resist swivelling movement of the cutting element relative to the bar under operating forces,

(c) the outer portion of each grass cutting element also having oppositely disposed first and second cutting portions provided with first and second cutting edges which extend downwardly and upwardly respectively from the bar so as to be spaced below and above a plane of the bar when the mower is positioned above the grass, so as to provide an active and an inactive cutting edge respectively dependent on the relative positions of the cutting element and the bar,

(d) the inner portion of each grass cutting element also having a second tang which is generally similar to the first tang, the tangs extending in opposite directions from a longitudinal plane of the inner portion, one particular tang engaging the location opening when the cutting edge associated with that tang is active.

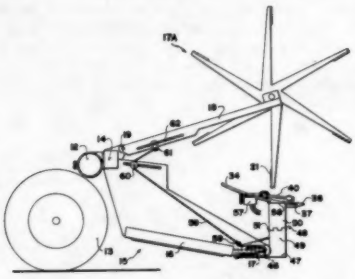
4,715,174

SNOW TRAP ATTACHMENT FOR CROP HARVESTING MACHINE

Mervin R. Lloyd, Box 55, D'Arcy, Sadkatchewan, Canada S0L 0N0, and Terrance A. Kon, Box 75, Brock, Saskatchewan, Canada S0L 0H0

Filed Feb. 24, 1986, Ser. No. 831,818
Claims priority, application Canada, Mar. 19, 1985, 476923
Int. Cl.[4] A01D 34/04, 34/24
U.S. Cl. 56—297 20 Claims

1. An attachment for a crop harvesting machine of the type having a transverse machine blade arrangement across the front harvesting section for cutting the crop and collection means onto which the cut crop is deposited for condensing, the attachment comprising an attachment blade arrangement for cutting the crop, means for driving the attachment blade arrangement, the attachment blade arrangement having a length which is a minor proportion of the length of the machine blade arrangement of the machine and means for mounting the attachment thereof at a position above and parallel to said machine blade arrangment whereby, with the machine blade arrangment arranged not to cut the crop at a position directly underlying the attachment, the attachment acts to cut the crop at a higher level than the machine blade arrangement to leave a strip of standing straw and to deposit the cut crop therefrom onto the collection means.

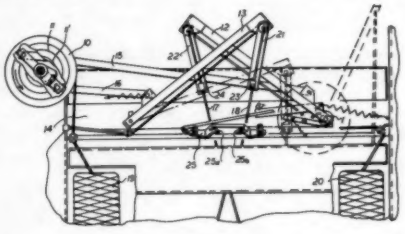


4,715,175

BINDER-TWINE GUIDE AND CUTTER MECHANISM FOR ROLL-BALER

Siegfried Schaible, Singen/Htwl.; Hans-Peter Wölfle; Eike Güsewell, both of Gottmadingen, and Bernhard Kohl, Winkelhaid, all of Fed. Rep. of Germany, assignors to Klockner-Humboldt-Deutz AG Zweigniederlassung Fahr, Gottmadingen, Fed. Rep. of Germany

Filed Dec. 11, 1985, Ser. No. 808,348
Claims priority, application Fed. Rep. of Germany, Dec. 11, 1984, 3445060
Int. Cl.[4] A01D 39/00
U.S. Cl. 56—432 7 Claims



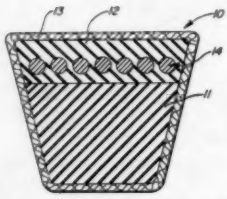
1. In a binding apparatus for tying up a round bale of agricultural harvested material formed in a baler, said binding apparatus being mounted on the housing of said baler, said binding apparatus comprising at least one cord supply spool, a cord guide mechanism for guiding at least one cord along the upper surface of said round bale to tie said bale up, and a cutting mechanism for said cord, said cutting mechanism being attached to said cord guide mechanism, wherein said cord guide mechanism comprises at least one cord guide arm and a cord disk having a gear unit, the improvement wherein said cutting mechanism is connected by a connecting rod to one end of a pulling strap, the other end of said pulling strap being attached by a pulling spring to a transverse truss provided for said binding apparatus, and on said cord guide mechanism an operating mechanism cooperating with said pulling strap is pro-

vided, in order to tie up said bale selectively once or twice before said cord is cut by said cutting mechanism.

4,715,176
POWER TRANSMISSION TENSILE CORD AND BELT MANUFACTURE

Satoshi Mashimo, Akashi; Kunihiro Fujita, Nishinomiya; Masayuki Tanaka, Kobe; Yoshio Yamaguchi, Kobe, and Kazuhiro Takeda, Kobe, all of Japan, assignors to Mitsuboshi Belting Ltd., Nagata Kobe, Japan

Filed Jun. 2, 1986, Ser. No. 869,331
Claims priority, application Japan, Jun. 3, 1985, 60-121047
Int. Cl.[4] D02G *3/40, 3/48*
U.S. Cl. 57—251 **15 Claims**



1. The method of forming an impact-resistant power transmission belt comprising

embedding in a rubber portion of a power transmission belt body adhesively coated thermally drawn and set tensile cords having a toughness of at least 8.5 g/d, an elongation of less than 2.2% under a load of 1.52 g/d, a shrinkage of no greater than 3.5% under dry heat of 150° C., and a shrinkage stress under dry heat of 150° C. of at least 0.20 g/d.

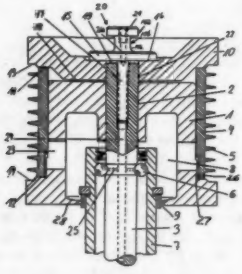
11. An impact-resistant power transmission belt tensile cord comprising

an adhesive-coated, thermally drawn and set, helically wound group of polyester filaments having a toughness of at least 8.5 g/d, an elongation of less than 2.2% under a load of 1.52 g/d, a shrinkage of no greater than 3.5% under dry heat of 150° C., and a shrinkage stress under dry heat of 150° C. of at least 0.20 g/d.

4,715,177
ATTACHMENT DEVICE FOR AN OPENING ROLLER AND A METHOD FOR USING THE ATTACHMENT DEVICE

Fritz Stahlecker, Bad Überkigen, Fed. Rep. of Germany, assignor to Hans Stahlecker, Süssen, Fed. Rep. of Germany

Filed Apr. 14, 1987, Ser. No. 38,136
Int. Cl.[4] D01H *7/895, 7/892;* D01G *15/28*
U.S. Cl. 57—408 **25 Claims**



1. Opening roller apparatus for an open-end spinning arrangement of the type having a shaft supporting the opening roller and an opening roller base body arranged on the shaft comprising:

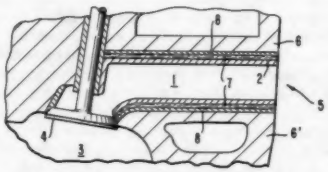
an exchangeable fitting ring means, said exchangeable fitting ring means fitting over said opening roller base body;

attaching means for attaching said exchangeable fitting ring means on said opening roller base body, said attaching means operating free of said opening roller base body.

4,715,178
EXHAUST PORT ASSEMBLY

Yasuo Tsukuda, Tokyo; Hisao Hara, Kumagaya; Hideki Harada, and Yasuo Iizuka, both of Saitama, all of Japan, assignors to Hitachi Metals, Ltd., Japan

Filed Aug. 1, 1984, Ser. No. 636,509
Claims priority, application Japan, Aug. 3, 1983, 58-142133
Int. Cl.[4] F01N *3/10*
U.S. Cl. 60—272 **5 Claims**

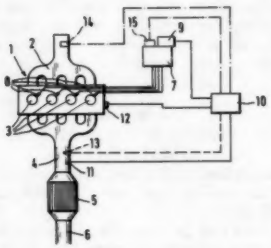


1. An exhaust gas port comprising a port pipe of heat resistant steel, a fibrous ceramic sheet covering the radially outer surface of said port pipe, and an aluminum layer covering the radially outer surface of said fibrous ceramic sheet, said aluminum layer being thin relative to the wall thickness of said port pipe, the port pipe covered by the fibrous ceramic sheet and the thin metal layer for being cast in an engine cylinder head block made of cast aluminum to connect a combustion chamber in the engine with an exhaust system.

4,715,179
METHOD AND DEVICE FOR THE REMOVAL OF SOLID COMPONENTS CONTAINED IN THE EXHAUST GASES OF INTERNAL COMBUSTION ENGINES

Eckart Muller, Gifhorn, and Rudolf Beckmann, Wolfsburg, both of Fed. Rep. of Germany, assignors to Volkswagen AG, Wolfsburg, Fed. Rep. of Germany

Continuation of Ser. No. 775,434, Sep. 12, 1985, abandoned. This application Jun. 8, 1987, Ser. No. 59,244
Claims priority, application Fed. Rep. of Germany, Sep. 14, 1984, 3433781
Int. Cl.[4] F01N *3/02, 3/18*
U.S. Cl. 60—274 **10 Claims**



1. A method of eliminating solid particles contained in exhaust gas of an internal combustion engine having an exhaust line and fuel feed means for injecting fuel into combustion spaces of the combustion engine for power generation, the fuel feed means having a maximum suppliable fuel flow which is

injected at a full load condition of the combustion engine, the method comprising the steps of: providing a filter in the exhaust line for collecting the solid particles; regenerating said filter by burning off the solid particles collected; and limiting, at the full load condition of the engine, the maximum fuel flow of the fuel feed means during said regenerating step to an amount which results in a residual oxygen content in the exhaust sufficient to ensure complete combustion of the solid particles.

4,715,180

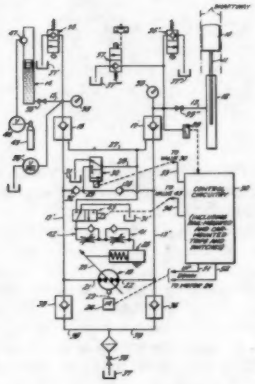
HYDRAULIC LIFT MECHANISM

Alan H. Rosman, Madrid, Spain, assignor to Dynamic Hydraulic Systems, Inc., Canoga Park, Calif.

Continuation-in-part of Ser. No. 570,590, Jan. 13, 1984, abandoned. This application Apr. 18, 1984, Ser. No. 601,481

Int. Cl.[4] F16H *39/46*

U.S. Cl. 60—372 **39 Claims**



1. In a hydraulically operated lift system wherein a pressurized hydraulic accumulator is continuously connected to a hydraulic lift actuator and wherein a rotary liquid-displacement device is interposed between the accumulator and the actuator, said rotary-displacement device having two flow-connection ports and an interposed rotor with externally accessible shaft connection to the rotor, the improvement in which a first barrier-type pilot-operated check valve is interposed in the connection between the accumulator and one port of the rotary-displacement device and is oriented to check flow in the direction from the accumulator, and in which a second barrier-type pilot-operated check valve is interposed in the connection between the lift actuator and the other port of the rotary-displacement device and is oriented to check flow in the direction from the lift actuator, control means including a prime mover having torque-responsive connection to said shaft, and means including pilot-operating pressure connections to said check valves and responsive to rotation of said prime mover.

4,715,181

DEVICE TO CONVERT PISTON-RECIPROCATING INTERNAL COMBUSTION ENGINES TO COMPRESSED AIR MOTORS

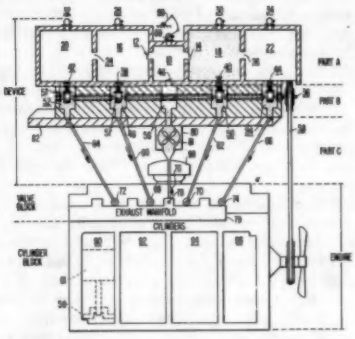
Luis G. Cestero, Parque San Patricio 2, Caparra Heights, San Juan 00936, P.R.

Filed Oct. 27, 1986, Ser. No. 923,595

Int. Cl.[4] F16D *31/02;* **F01B** *29/04*

U.S. Cl. 60—412 **4 Claims**

1. A device for converting to operation by air pressure a conventional internal combustion engine having at least one cylinder and piston operably connected to a crankshaft, and exhaust manifold and a spark plug opening, said engine operating on an admission, compression, work, exhaust stroke cycle, said device comprising first and second fluid pressure reservoirs interconnected through first one-way valve means permitting fluid flow from the first to the second reservoir but not in the reverse direction, a pressure relief valve in said second reservoir, a first fluid passage connecting said exhaust manifold and said first reservoir and into which all of the exhaust fluid from said cylinder flows during the exhaust stroke, a second one-way valve in said first fluid passage enabling the flow of exhaust fluid in said first passage to said first reservoir but not



in the reverse direction, a compressor in said first fluid passage between said exhaust manifold and said second one-way valve and operable by a power source separate from said engine to compress at all times all of the exhaust fluid in said first fluid passage into said first reservoir through said second one-way valve, a second fluid passage between said second reservoir and said spark plug opening, a third valve biassed to closed position in said second passage to control the flow of fluid from said second reservoir to said spark plug opening, and means for opening said third valve in timed sequence substantially at the commencement of the work stroke of said engine.

4,715,182

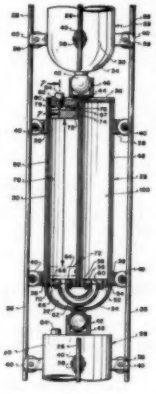
ENERGY PRODUCING APPARATUS

Carl F. Adams, 6527 Coldwater Canyon Ave., North Hollywood, Calif. 91606

Filed Apr. 13, 1987, Ser. No. 40,558

Int. Cl.[4] F03B *17/02*

U.S. Cl. 60—495 **9 Claims**



1. An energy producing apparatus for obtaining a working

fluid wherein the working fluid is to be used to operate a work producing device, said apparatus comprising:

a silo, said silo having a longitudinal center axis, said longitudinal center axis being located substantially vertical, said silo having an open top and a closed bottom, said silo being substantially filled with a liquid;

track means mounted within said silo, said track means extending from said open top to said closed bottom;

a carriage assembly, said carriage assembly having a carriage housing, said carriage housing having mounted thereon track engaging means, said track engaging means to connect with said track means and be movable thereon permitting movement of said carriage assembly between said open top and said closed bottom, said carriage housing having an internal chamber;

a fluid cylinder mounted within said internal chamber, said fluid cylinder defining an inner compartment, a piston movably mounted within said inner compartment, said piston dividing said inner compartment into a gas containing section and a liquid containing section;

a gas, said gas being located within said gas containing section;

an orifice formed within said fluid cylinder, said orifice connecting with said liquid containing section; and

a valve mounted in conjunction with said orifice, said valve permitting flow of liquid into said liquid containing section, said valve normally preventing flow of liquid from said liquid containing section, whereby as said carriage assembly submerges deeper into said silo some of said liquid passes said valve into said liquid containing section thereby moving said piston against said gas containing section compressing said gas contained therein, upon the maximum amount of said liquid being located within said liquid containing section at said closed bottom said carriage assembly is then moved to said open top and removed from said silo with the said liquid contained within said liquid containing section being removed therefrom and utilized to produce work.

4,715,183

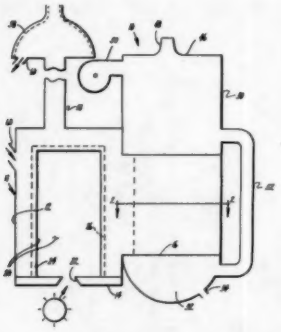
DUAL SOURCE EXTERNAL HEATING SYSTEM FOR A HEAT PIPE

Roelf J. Meijer, and Benjamin Ziph, both of Ann Arbor, Mich., assignors to Stirling Thermal Motors, Inc., Ann Arbor, Mich.

Filed Feb. 27, 1987, Ser. No. 19,590

Int. Cl.[4] F02G *1/055*; F03G *7/02*

U.S. Cl. 60—524 **3 Claims**



1. An external heating system for supplying thermal energy to a heat engine which enables both solar energy and heated gases to be employed as heat sources comprising:

a heat pipe evaporator cavity,

a solar energy cavity,

a heat exchanger section communicating with said solar energy cavity defining a plurality of hollow fins, and

a gas combustor having a combustion chamber and a housing for directing the heated gasses from said combustion chamber past said hollow fins.

4,715,184

KNOCK CONTROL SYSTEM FOR SUPERCHARGED INTERNAL COMBUSTION ENGINE

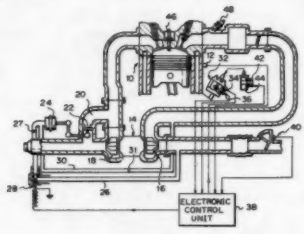
Kouichi Oosawa, and Yoshiaki Kinoshita, both of Susono, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Filed Aug. 29, 1986, Ser. No. 901,819

Claims priority, application Japan, Sep. 10, 1985, 60-198589

Int. Cl.[4] F02D *23/00*

U.S. Cl. 60—602 **4 Claims**



1. A knock control system for a supercharged spark-ignition internal-combustion engine having a supercharger and an electronic ignition system, comprising:

means for determining a basic spark advance in said ignition system in response to actual rotational speed and load of the engine;

means for determining a retard correction value in response to an occurrence of detonation;

means for correcting the basic spark advance by the retard correction value to determine an executive spark advance, by which the electronic ignition system causes an ignition spark to be generated;

means for comparing the retard correction value with at least one predetermined reference value;

boost pressure control means for reducing a supercharger boost pressure in response to the retard correction value being greater than the predetermined reference value, and for increasing the boost pressure in response to the retard value being smaller than the predetermined reference value;

memory means for storing predetermined engine load threshold values for different rotational speeds of the engine;

means for sensing an actual engine speed;

means responsive to the actual engine speed for accessing the memory means and retrieving therefrom a predetermined engine load threshold value for the actual engine speed;

means for sensing an actual engine load;

means for comparing the actual engine load with said predetermined engine load threshold value for said actual engine speed; and

means for cancelling the operation of said boost pressure control means when the actual engine load is smaller than the engine load threshold value.

4,715,185

METHOD AND MEANS FOR INCREASING ENERGY OUTPUT AND THERMAL EFFICIENCY OF AN ENERGY CYCLE SUCH AS THE RANKINE STEAM CYCLE

Eric A. Salo, 15898 Via Pinale, San Lorenzo, Calif. 94578

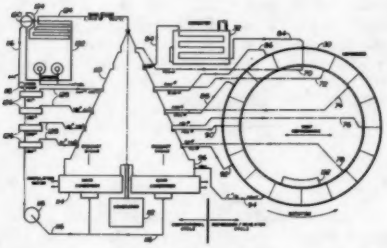
Filed Oct. 3, 1986, Ser. No. 916,009

Int. Cl.[4] F01K *17/00*

U.S. Cl. 60—677 **4 Claims**

1. In the combination of an electrical generator and a steam

drive therefor, the improvement comprising first means for repressurizing partially expanded steam from the turbine, second means for reheating the repressurized steam, and third means for feeding the repressurized reheated steam into the turbine into driving relation therewith under higher pressure and temperature conditions than those for said partially expanded steam, said first means comprising a continuous closed-path housing, a conveyor rotor therein having spaced interconnected discs defining with the housing steamconveying compartments, a plurality of conduits interconnecting different steam extraction stations at the turbine with different steam



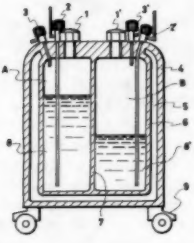
injection stations at the housing, whereby said compartments may receive steam under progressively higher pressure conditions, a conduit interconnecting the compartment under highest steam pressure with said second means while higher pressure extraction steam is being introduced into said compartment, whereby pressurized steam in said compartment is displaced into said second means and therethrough and through said through means to a high pressure injection station at said turbine, and one or more conduits adapted to thereafter interconnect said compartment with one or more other lower pressure injection stations at said turbine.

4,715,186

COOLANT PRESERVATION CONTAINER

Hajime Ishimaru, Ibaraki; Masao Miyamoto, and Shojiro Komaki, both of Tokyo, all of Japan, assignors to Seiko Instruments & Electronics Ltd., Tokyo, Japan

Filed Nov. 19, 1985, Ser. No. 799,414
Claims priority, application Japan, Nov. 19, 1984, 59-244301
Int. Cl.[4] F17C *1/00*
U.S. Cl. 62—45 **18 Claims**



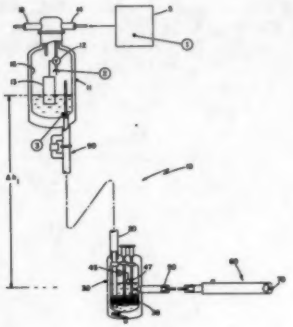
1. A coolant preservation container comprising:
an outerwall defining an enclosed space therein;
an innerwall provided within said enclosed space and defining a container member therein;
means defining at least one vacuum space formed between said outerwall and said innerwall for making said container member adiabatic;
a partition comprised of a single, thermally conductive plate dividing said container member into a plurality of individual closed chambers; and
at least one port provided on each individual closed chamber for introducing a cryogenic liquid into each individual closed chamber and/or for discharging the cryogenic liquid from each individual closed chamber.

4,715,187

CONTROLLED CRYOGENIC LIQUID DELIVERY

Thornton Stearns, Winchester, Mass., assignor to Vacuum Barrier Corporation, Woburn, Mass.

Filed Sep. 29, 1986, Ser. No. 912,923
Int. Cl.[4] F17C *7/02*
U.S. Cl. 62—55 **20 Claims**



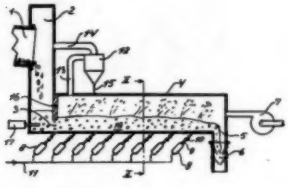
1. System for delivering a controlled stream of liquid cryogen from an outlet, the system comprising:
(a) a source of liquid cryogen at substantially constant pressure, remote from the outlet;
(b) a conduit connecting the source of liquid cryogen to the outlet;
(c) a flow-rate control restriction positioned in the conduit; and
(d) means to maintain cryogen substantially entirely in liquid phase as it flows through the conduit, and out of the outlet, and to maintain said flowing cryogen at a temperature substantially equal to or below the cryogen's boiling point at atmospheric pressure;
whereby the cross-sectional area of the restriction controls the rate of liquid cryogen delivered at the outlet, and cryogen is reliably delivered at the outlet without severe flashing.

4,715,188

METHOD AND COOLER FOR COOLING GRANULAR MATERIAL

Torben Enkegaard, Copenhagen, Denmark, assignor to F. L. Smidth & Co. A/S, Copenhagen, Denmark

Filed Jun. 19, 1986, Ser. No. 876,243
Claims priority, application United Kingdom, Jun. 28, 1985, 8516474
Int. Cl.[4] F25D *13/06*
U.S. Cl. 62—63 **5 Claims**



1. A cooler for cooling granular material, said cooler comprising a horizontal or inclined non-rotatable cooler body

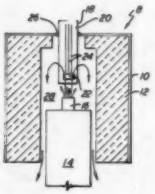
having a material inlet end and a material outlet end, a cooling air source for providing cooling air through said cooler in a direction from said material outlet end toward said material inlet end, at least one row of shock air blasters mounted along the bottom of said cooler body, said shock air blasters having air outlets projecting upwardly through said bottom of said cooler body so as, in use, to direct air blasts against said material and cause said material to be dispersed and suspended in said cooler.

4,715,189

OPEN CYCLE COOLING OF ELECTRICAL CIRCUITS

Gert K. G. Hohenwarter, Tarrytown, N.Y., assignor to Hypres, Inc., Elmsford, N.Y.

Filed Nov. 12, 1985, Ser. No. 796,842
Int. Cl.[4] F25D *17/02*
U.S. Cl. 62—64 **10 Claims**



1. A method for localized cooling of a device containing a low temperature region, comprising the steps of:

(a) confining said low temperature region of said device in a housing which is open to the surrounding environment and which permits said low temperature region to be operably connected to a second device disposed outside the housing;

(b) carrying a cooling fluid from a cooling fluid source and directing a stream of the cooling fluid into the housing in the vicinity of said low temperature region so that the cooling fluid makes thermal contact with said low temperature region; and

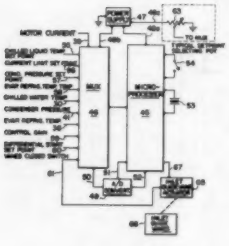
(c) venting the cooling fluid away from the vicinity of said low temperature region of said device and into the surrounding environment.

4,715,190

CONTROL AND METHOD FOR MODULATING THE CAPACITY OF A TEMPERATURE CONDITIONING SYSTEM

Doyoung Han, North Syracuse, N.Y., and Merle A. Renaud, Onalaska, Wis., assignors to American Standard Inc., New York, N.Y.

Division of Ser. No. 800,426, Nov. 21, 1985, Pat. No. 4,689,967.
This application Feb. 10, 1987, Ser. No. 13,110
Int. Cl.[4] F25D *17/02*; F25B *1/00*
U.S. Cl. 62—201 **20 Claims**



1. In a temperature conditioning system for conditioning a fluid to a setpoint temperature, a control for modulating the capacity of the system when an operating parameter is near a limit associated with protective shutdown of the system to avoid catastrophic failure, said control comprising

a. means for sensing the condition of the operating parameter;

b. means for selecting the limit for the operating parameter; and

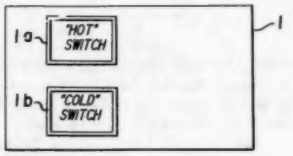
c. control means, responsive to the sensing means and the selecting means, for determining the deviation of the operating parameter from its limit and for modulating the capacity of the system according to a first predefined function of the deviation if the deviation is greater than a deadband and according to a second predefined function of the deviation if the deviation is less than the deadband.

4,715,191

AIR CONDITIONING METHOD

Hiroyuki Umemura; Kenji Matsuda; Tomofumi Tezuka; Kazuaki Isono; Hidenori Ishioka, all of Shizuoka; Sakuo Sugawara, and Masanori Hara, both of Kamakura, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 14, 1986, Ser. No. 918,725
Claims priority, application Japan, Oct. 15, 1985, 60-229075; Oct. 15, 1985, 60-229071; Oct. 15, 1985, 60-229072; Oct. 15, 1985, 60-229073; Aug. 1, 1986, 61-1544
Int. Cl.[4] F25B *41/00*
U.S. Cl. 62—208 **10 Claims**



1. An air conditioning method with use of an air conditioner which comprises a compressor placed in an air conditioner main body, a temperature detector for detecting temperature in a room, an A/D converter for converting an output from the temperature detector into a digital signal and a microcomputer which stores the output of said A/D converter and a set point value of temperature and compares the former with the latter thereby to produce an instruction signal to said compressor, characterized by comprising:

a step of determining whether or not an input signal is produced from a plurality of switches for specifying a condition, said input signal being produced by a "hot" switch to be operated by a user when he feels hot and a "cold" switch to be operated when he feels cold,

a step of determining a set point temperature on the basis of the signal from said switches, wherein when said "hot" switch is operated, the set point temperature is changed to a temperature equal to the room temperature minus a predetermined value and when said "cold" switch is operated, the set point temperature is changed to a temperature equal to the room temperature plus a predetermined value,

a step of comparing data provided at said set point temperature determining step with the room temperature detected by said temperature detector to produce a signal, and,

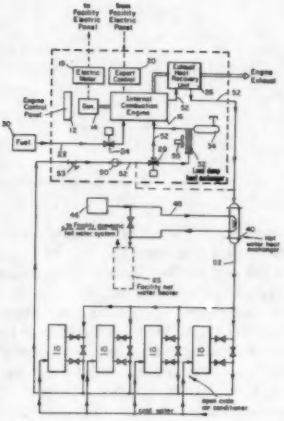
a step of controlling said compressor based on said signal as a result of the comparison.

4,715,192

ELECTRICAL OR THERMAL TRACKING COGENERATION SYSTEM UTILIZING OPEN CYCLE-AIR-CONDITIONING

Yoram Katz, Los Angeles, Calif., assignor to Imperial Private Power, Santa Monica, Calif.

Filed Jun. 15, 1987, Ser. No. 61,455
Int. Cl.[4] F25B 27/00
U.S. Cl. 62—323.1 9 Claims



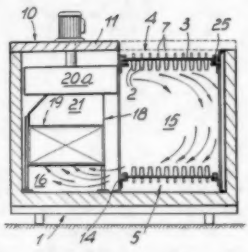
1. A cogeneration system comprising:
a. generator;
b. an internal combustion engine for driving said generator;
c. a fuel source connected to said internal combustion engine
d. valve means for regulating the amount of fuel supplied to the internal combustion engine;
e. an exhaust heat recovery unit connected to said engine;
f. a hot water heat exchanger connected to said exhaust heat recovery unit;
g. at least one open cycle air-conditioner connected to said hot water heat exchanger;
h. a pump for circulating fluid through the cogeneration system;
i. a load dump heat exchanger;
j. fan means associated with said load dump heat exchanger; and
k. three way valve means regulating fluid flow between said pump means, said load dump heat exchanger, and said engine;
l. whereby fuel is supplied to said internal combustion engine through the interconnecting valve means, the internal combustion engine runs said generator which generates electricity to operate said hot water heat exchanger and said open cycle air-conditioner, and said pump circulates fluid which has been cooled by said at least one open cycle air-conditioner through said internal combustion engine to cool the internal combustion engine, from the internal combustion engine through said exhaust heat recovery unit, from the exhaust heat recovery unit through said hot water heat exchanger, from the hot water heat exchanger through said at least one open cycle air conditioner, to said three way valve means which regulates the water flow either directly to said internal combustion engine or through said load dump heat exchanger if the open cycle air-conditioner is not operating or only partially operating, and back through said internal combustion engine.

4,715,193

PLANT FOR THE PRODUCTION OF POPSICLES AND ICECREAMS INCORPORATING A HOLDING STICK

Carlo Curti, Milan, Italy, assignor to Sauer S.p.A., Milan, Italy

Filed Feb. 6, 1986, Ser. No. 826,882
Claims priority, application Italy, Feb. 6, 1985, 19405 A/85
Int. Cl.[4] A23G 9/26
U.S. Cl. 62—345 8 Claims



3. A plant for the production of popsicles and ice creams incorporating a holding stick, comprising
a plurality of molds adapted to contain popsicles or ice creams being processed,
a guide means for moving said molds along a closed path having two superimposed main sections, including a forward one and a return one,
a thermally insulating casing, refrigerating members, and plural processing station all laid out along said path for said molds,
wherein
predominant portions of both said main forward section and said main return section are accommodated within said thermally insulating casing,
said refrigerating members include a plurality of cooling sets accommodated in said casing, each having at least one fan for circulating cool air along both said main path sections,
rigid strips are provided to support arrays of said molds having confronting edges with a bent over recessed shape, and
small flexible tubes are clamped between said edges, said small flexible tubes forming swivels between said strips and airtight seals, and
said plant further comprising
chains for entraining said rigid strips,
further seal provided at the ends of said strips and at chains for entraining the strips, adapted to define a closure for said casing at openings formed in a top wall of the casing,
cradle elements for supporting said chains,
small sheets for covering said chains, and
flexible lugs engaged with at least said cradle elements and carried slidably in contact with said strips.

4,715,194

ICE MAKING MACHINE WITH WATER DISTRIBUTOR

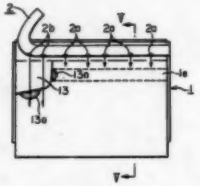
Yoshikazu Kito, Toyoake, Japan, assignor to Hoshizaki Electric Co., Ltd., Toyoake, Japan

Filed Oct. 23, 1986, Ser. No. 922,169
Int. Cl.[4] F25C 1/12
U.S. Cl. 62—347 8 Claims

1. An ice making machine repeating an ice making cycle and a deicing cycle during operation thereof, comprising:
a freezing plate having one surface placed in contact with an evaporator and the other surface serving as a freezing surface;
a compressor in fluid communication with said evaporator for supplying a refrigerant thereto;
means disposed in the vicinity of one end of said freezing

plate for distributing water over said freezing surface of said freezing plate during the ice making cycle; and

said water distributing means including means operative during the ice making cycle for leaving a predetermined region of said freezing surface a dry zone in which no water is distributed on said freezing surface, said predetermined region corresponding in position to a portion of the region of said freezing plate where said evaporator is disposed, whereby the dry zone in which no water is distributed and which is in a region adjacent the evaporator is inherently somewhat colder than the region on which water is distributed, thereby ensuring the formation of a solid ice nucleus for propagation of ice to be made.



4,715,195

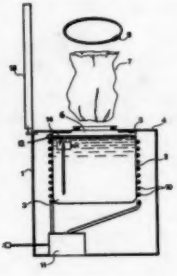
APPARATUS FOR RAPID COOLING OF CONTAINERS

Iosif Kucza, 160 Chalkfarm Drive, Apt. 818, Downsview, Ontario, M3L 2J1, Canada

Filed Jun. 2, 1987, Ser. No. 56,638

Int. Cl.[4] F25D *17/02*

U.S. Cl. 62—376 **10 Claims**



1. Apparatus for cooling articles comprising:

a top-opening cabinet;

a tub in the cabinet for holding liquid;

a plate across the tub, said plate having an opening;

refrigeration means connected for cooling the liquid; and

an open bag for holding the article, where the bag extends into the tub and the periphery of the bag is sealed across the opening in the plate thereby preventing direct access to the liquid from outside the cabinet, and where the bag is of a thin, flexible, liquid-impervious material;

whereby when sufficient liquid is placed in the hub so that a substantially part of the bag is in contact with the liquid and an article is placed in the bag, the bag will substantially conform to the shape of that part of the article lying below the surface of the liquid.

4,715,196

OIL RETURNING MECHANISM OF EVAPORATOR FOR AIR CONDITIONER

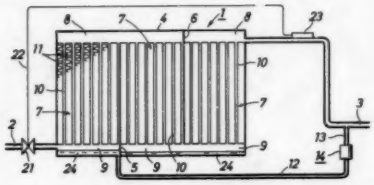
Hiroyuki Sugiura, Saitama, Japan, assignor to Diesel Kiki Co., Ltd., Tokyo, Japan

Filed Apr. 3, 1987, Ser. No. 33,818

Claims priority, application Japan, Apr. 11, 1986, 61-82164; May 23, 1986, 61-118824

Int. Cl.[4] F25B *43/02*

U.S. Cl. 62—468 **3 Claims**



1. An air conditioner including a cooling medium compressor, a condenser, an expansion valve and an evaporator, these being connected one another by a cooling medium capillary tube to circulate a cooling medium, whereby an oil returning mechanism of an evaporator for the air conditioner is characterized in that there is provided an oil reservoir for reserving a lubricating oil after oil separation at a lower part of said evaporator, said oil reservoir and an outlet tube for guiding the cooling medium passed through said evaporator to said cooling medium compressor being connected by an oil returning tube, said oil returning tube being provided with a controlling valve, when a pressure differential between said oil returning tube and said outlet tube is a predetermined level or more, said controlling valve being closed to enhance a normal flow of the cooling medium from said evaporator to said cooling medium compressor, when said pressure differential is a predetermined level or less, the lubricating oil staying in the oil reservoir being fed to said cooling medium compressor via said oil returning tube and outlet tube.

4,715,197

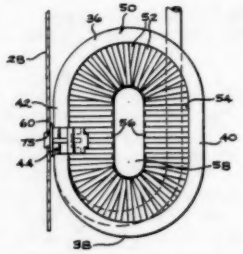
CLAMP ASSEMBLY

Mark D. Wattley, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Filed Mar. 23, 1987, Ser. No. 28,878

Int. Cl.[4] F25B *39/02*

U.S. Cl. 62—515 **7 Claims**



1. A clamp assembly comprising:

a tubular elongated member having a portion of its circumference relatively smooth and a portion having a fin array comprising fins formed along a base line of the tubular elongated member, said fins extending radially outward from their attachment to the elongated member and bent alternately to diverge away from each other;

a clamp device having a base with securing means at one end from the base to fasten the clamp device to a structural panel member, two spaced apart legs at the other end from the base, said legs having a first portion spaced apart a distance sufficient to receive the tubular elongated member therebetween, a second portion diverging outwardly from the first portion, a third portion reversely bent relative to the second portion and forming inwardly directed resilient fingers converging toward the base and each other, said fingers having free ends and an inwardly directed projection located near the free end; and

said tubular elongated member being received between the two spaced apart legs of the clamp device and retained therein by the fingers of the third portion with said projections positioned between the alternately bent fins in close proximity to the base line of the tubular elongated member.

4,715,198

CONTROL MAGNET ASSEMBLY FOR A PATTERN APPARATUS IN KNITTING MACHINES FOR ELECTRICALLY CONTROLLED NEEDLE SELECTION

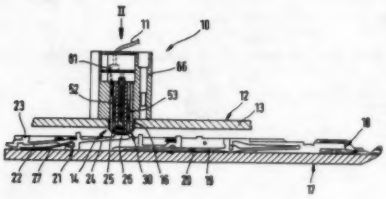
Jürgen Ploppa, Pfullingen, and Franz Schmid, Bodelshausen, both of Fed. Rep. of Germany, assignors to H. Stoll GmbH & Co., Fed. Rep. of Germany

Filed Mar. 25, 1987, Ser. No. 30,014

Claims priority, application Fed. Rep. of Germany, Apr. 26, 1986, 3614220

Int. Cl.[4] D04B *7/00*

U.S. Cl. 66—75.2 **15 Claims**



1. A control magnet assembly for a pattern apparatus in knitting machines for electrically controlled needle selection by controlling the armature element of selection jacks of the knitting machine operatively associated with the needles, comprising:

at least one selection magnet system having at least one permanent magnet retainer pole zone and at least one control pole zone, with said at least one control pole zone having a control coil associated therewith which is energized in accordance with the selection pattern;

a measuring head for detecting the magnitude of the magnetic field of the control pole zone; and

a circuit layout situated between the measuring head and the control coil for controlling the magnetic field of the control pole zone.

4,715,199

HIGH-TEMPERATURE DYEING APPARATUS

Guenther Kehlenbach, Wuerselen, Fed. Rep. of Germany, assignor to H. Krantz GmbH & Co., Aachen, Fed. Rep. of Germany

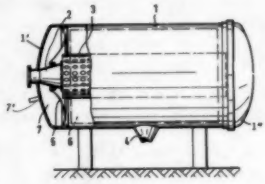
Filed Apr. 10, 1986, Ser. No. 850,013

Claims priority, application Fed. Rep. of Germany, Apr. 12, 1985, 3513088

Int. Cl.[4] D06B *5/18, 23/00*

U.S. Cl. 68—198 **7 Claims**

1. An apparatus for dyeing materials at high temperatures, comprising a cylindrical pressure container having a horizontally extending axis, means mounted in said pressure container for holding material to be dyed, dyeing liquid inlet and outlet means connected to said pressure container for circulating said dyeing liquid through said pressure container, flexible membrane means inside said pressure container for dividing said pressure container into a first chamber and into a second chamber smaller than said first chamber, means for mounting said



flexible membrane means inside said pressure container, and means for admitting a pressurized medium into said second smaller chamber for maintaining a required operating pressure in said first larger chamber through said flexible membrane means.

4,715,200

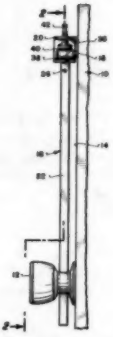
LOCKING DEVICE FOR A DOOR LOCK

James Katsaros, 616 S. Normandie Ave., Apt. 1303, Los Angeles, Calif. 90005

Filed Feb. 18, 1987, Ser. No. 16,676

Int. Cl.[4] E05B *13/08*

U.S. Cl. 70—211 **2 Claims**



1. In combination with a door, said door having a first locking mechanism for latching of said door, a doorknob connected to said first locking mechanism, said doorknob protruding from the surface of said door, a second locking mechansim mounted on said door, said second locking mechanism including a handle, said handle protruding from the surface of said door, said handle being manually movable from a locking position to an unlocking position, a locking device for said door comprising:

a bracket having an internal compartment, said handle to be located within said internal compartment, means mounted on said bracket movable to tightly engage with and be fixed to said handle;

an elongated bar having an inner end and an outer end, said bracket being attached by attaching means to said inner end, said doorknob abutting with said outer end, said bracket being movable relative to said elongated bar to assume various positions, said bracket being fixable to said elongated bar in each said position;

said bracket being pivotable about a pivot axis, said bracket having an apex portion, said elongated bar having an elongated center axis, said pivot axis being substantially perpendicular to said center axis of said elongated bar, during pivoting movement of said bracket relative to said

elongated bar said apex portion of said bracket remains in contact with said bar during the entire pivoting movement; and

said bracket having a leg portion, said bracket being removable by disconnecting of said attaching means and moving said apex portion from said elongated bar and locating said leg portion against said elongated bar and re-engaging said attaching means.

4,715,201

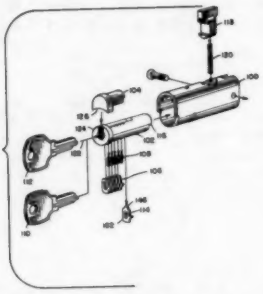
CYLINDER LOCK WITH REMOVABLE PLUG

Clark E. Craig, Simpsonville, S.C., assignor to Valhi, Inc., Dallas, Tex.

Continuation-in-part of Ser. No. 669,538, Nov. 8, 1984, Pat. No. 4,672,827. This application Jun. 5, 1986, Ser. No. 870,940

Int. Cl.[4] E05B *29/02*

U.S. Cl. 70—369 **4 Claims**



1. An improved cylinder lock with a key operated removable plug comprising, in combination:

a first key means for operating the cylinder lock;

a second key means for allowing removal of the plug;

a cylinder having a longitudinal axis and defining a passage including a cylindrical portion of substantially constant diameter said cylinder also including tumbler recess means in a longitudinal direction along one side of the passage, and a longitudinal recess having an arcuately shaped cross section at the opposite side of the passage from the one side, said longitudinal recess having parallel sides extending parallel to the longitudinal axis;

an outwardly extending circumferential flange at one end of the passage, a groove in the inside surface of the passage through the flange to the longitudinal recess;

a plug rotatably mounted for rotation about the longitudinal axis in the cylindrical portion of the passage, said plug having an outside diameter substantially equal to the diameter of the cylindrical portion and rotatably mounted in the cylindrical portion, said plug including front face plate means of greater diameter than the plug to limit translation of the plug into the cylinder from the front of the passage, said plug including:

a plurality of tumbler passages generally transverss to the longitudinal axis;

an associated, longitudinal key slot mateable with the first and second key means and interconnecting the tumbler passages, and

a control tumbler passage mateable with the first and second key means, said control tumbler passage positioned at least in part longitudinally spaced from the front face plate means and beyond the circumferential cylinder flange when the plug is in the cylinder;

a plurality of combinating tumblers in the tumbler passages configured to engage both the first and second key means, each tumbler defining a dimension transverse to the longitudinal axis greater than the plug diameter, biasing means for the combinating tumblers in each tumbler passage, to bias the combinated tumblers beyond the plug diameter to engage the tumbler recess means on the one side of the passage in the cylinder and prevent plug rotation, said tumblers being translated against the force of the biasing means by either the first key means or the second key means to align the tumblers projecting beyond the diameter of the plug into the longitudinal recess on the opposite side of the passage whereby the plug may be rotated with the tumblers rotatable in the longitudinal recess:

an unbiased control disc tumbler in the control tumbler passage configured to engage both the first and second key means, said control disc tumbler defining a dimension transverse to the longitudinal axis greater than the plug diameter, said control disc tumbler defining means engaging the flange and preventing movement of the plug in a longitudinal direction out of the cylinder (1) when the first key means is placed in the key slot to engage the control tumbler and (2) when no key means is in the key slot; said control disc tumbler also defining means disengageable from the flange to release the plug when the second key means are engaged with the tumblers to align the combined tumblers within the longitudinal recess of the cylinder and the control tumbler disc is also translated to align one end with the groove through the flange, said one end shaped to slide in the groove, the opposite end of said control disc tumbler having a width greater than the width of the groove and tumbler recess means.

4,715,202

COIL-SPRING WINDING APPARATUS

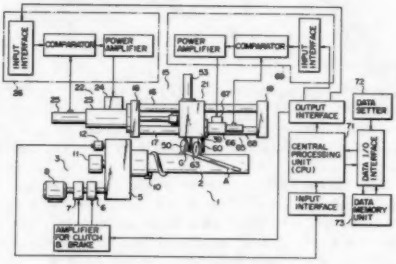
Masaharu Shibata, Kamakura; Tsutomu Furuyama, and Kazuo Ohkoshi, both of Yokohama, all of Japan, assignors to NHK Spring Co. Ltd., Yokohama, Japan

Filed Apr. 13, 1987, Ser. No. 37,865

Claims priority, application Japan, Apr. 22, 1986, 61-92816

Int. Cl.[4] B21F *3/04*

U.S. Cl. 72—21 **5 Claims**



1. A coil-spring winding apparatus for manufacturing a coil spring by forming a heated rod-shaped material into a spiral, comprising:

a mandrel having one end and an outer peripheral surface on which the coil is to be wound;

first drive means, for rotating the mandrel, said drive means including a motor;

a chuck used for holding a leading end of the coil, said chuck being located at one end of the mandrel and adapted to rotate together therewith;

a guide rail extending parallel to the mandrel;

a carriage supported by the guide rail, for reciprocation along the rail;

second drive means, for moving the carriage, said second drive means including a first actuator, for moving the carriage at a speed determined by the rotating speed of the mandrel;

a first holder, attached to the carriage so as to be movable in the radial direction of the mandrel;

a first guide roller mounted on the first holder, said guide

roller having an outer peripheral surface facing that of the mandrel, said peripheral surface having a groove thereon in which a part of the coil can be fitted;

a second actuator, for moving the first guide roller together with the first holder, in the radial direction of the mandrel;

a second guide roller, arranged at a radial distance from the first guide roller, and adapted to guide the coil toward the first guide roller;

supporting means attached to the carriage and supporting the second guide roller, said supporting means including a second holder for mounting the second guide roller, wherein the second guide roller is supported such that the second guide roller substantially faces a point of contact between the first guide roller and the coil, and is pivotable substantially around the contact point; and

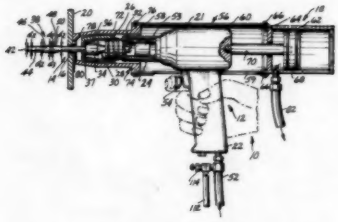
a third actuator, for reorienting the second guide roller in accordance with the pitch angle of the coil spring.

4,715,203

COLD-WORKING TOOL

John H. Wiegenstein, Bellevue, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Nov. 14, 1985, Ser. No. 798,001
Int. Cl.⁴ B30B *15/00*
U.S. Cl. 72—30 **10 Claims**



1. A cold-working tool for thrusting an attached mandrel partially through a hole in a metal workpiece and extracting the mandrel from the hole, comprising:

(a) a gun having a body, handle portion, and a elongate barrel, the barrel having an outer end located away from the body of the gun;

(b) a boss having an inner end and an outer end, the inner end of the boss being retained within the outer end of the barrel, the inner end of the boss being slidable within the barrel, the outer end of the boss having the mandrel attached thereto;

(c) penumatic means associated with the gun and operable for delivering a succession of impulsive forces to the inner end of the boss and attached mandrel, a portion of the mandrel being forced through the hole by the impulsive forces;

(d) a piston and cylinder assembly, the piston being slidable within the cylinder and having an attached rod extending from the cylinder with its outermost end attached to the gun, the piston and cylinder assembly and gun being configured and arranged so that when pressurized fluid is directed into the cylinder the piston is moved within the cylinder thereby creating a force tending to draw the gun and cylinder toward each other;

(e) a housing having a first end and a second end, the first end connected to the piston and cylinder assembly, the housing configured so that its second end projects outwardly beyond the boss, the second end of the housing being positionable against the metal workpiece to brace the piston and cylinder assembly against the metal workpeice with the gun substantially between the piston and cylinder assembly and the metal workpiece for preventing movement of the cylinder toward the gun when pressurized fluid is directed into the cylinder, the housing being further configured to substantially enclose the gun and permit movement of the gun within the housing; and,

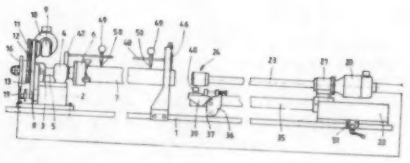
(f) operating means for selectively supplying pressurized fluid into the cylinder of the piston and cylinder assembly.

4,715,204

METHOD AND APPARATUS FOR ACCURATELY CENTERED ALIGNMENT OF A HOLLOW ROTATION SYMMETRICAL WORKPIECE

Norbert Ottlik, deceased, late of Augsburg, Fed. Rep. of Germany (by Klara Ottlik, Elisabeth Nowak, heirs), assignor to M.A.N. Roland Druckmaschinen Aktiengesellschaft, Offenbach am Main, Fed. Rep. of Germany

Filed Feb. 12, 1986, Ser. No. 828,829
Claims priority, application Fed. Rep. of Germany, Feb. 23, 1985, 3506450
Int. Cl.⁴ B21D *3/10*; B21J *7/32, 7/46*
U.S. Cl. 72—76 **19 Claims**



19. Method for accurately centering the alignment of a wall portion of a rotational symmetrical hollow workpiece (7) comprising the steps of

measuring the outer wall of the workpiece (7) and determining the minimum distance of the wall portion from the longitudinal axis of the workpiece;

introducing a hammering element (27,28) into the workpiece and hammering, from the inside of the workpiece, the wall portion which has the minimum distance from the axis of rotation, toward the outside;

rotating said workpiece about the longitudinal axis relatively moving the hammering element with respect to said wall portion in at least one of the directions: axially; circumferentially, with respect to the axis of rotation of the rotation symmetrical workpiece;

and changing the frequency of hammering operation as a function of the rotation position of the hammering element against the respective inner wall portion of the workpiece from the minimum distance of the wall portion with respect to said wall portion.

4,715,205

PLANETARY-TYPE ROLLING MILL FOR NON-FLAT PRODUCTS

Bernard Fazan, Metz, France, assignor to IRSID, Saint Germain-en-Laye, France

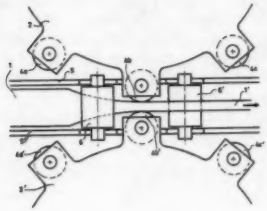
Continuation of Ser. No. 704,226, Feb. 22, 1985, abandoned. This application Aug. 4, 1986, Ser. No. 892,457
Claims priority, application France, Feb. 22, 1984, 84 02803
Int. Cl.⁴ B21B *13/20*
U.S. Cl. 72—198 **2 Claims**

1. A rolling mill of universal planetary type for rolling long products of circular cross section, in which a rolling action is performed by work rolls acting as opposing paired work rolls arranged equiangularly at the periphery of rotating rolling units distributed symmetrically about the product to be rolled, wherein:

(a) the axes of said work rolls are parallel with the axis of the rotating rolling unit which bears them;

(b) each work roll is a solid of revolution having two truncated cones with equal minor bases joined together axially forming a waist of circular shape extending over an arc of

a circle greater than 90° having its center equidistant from the two axes of said opposing paired work rolls when the latter are performing the rolling action on a said product, said waist having an axis of symmetry other than the plane containing the longitudinal axis of the rolled product and



perpendicular to the axis of said work rolls; and said waist spreads outwardly at both ends, thereby providing a continuous transition between the portion of the surface of the rolled product in contact with said work roll and the portion of said surface which is not in such contact.

4,715,206

ROLLING STAND OF THE TYPE WITH TIE-RODS WITH OSCILLATING SUPPORTS WITH INTERCHANGEABLE INTERMEDIATE HOLDER BASES

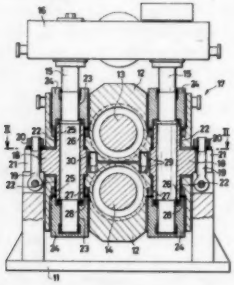
Luigi Forni, Castellanza, Italy, assignor to Pomini Farrel S.p.A., Castellanza, Italy

Continuation of Ser. No. 736,756, May 22, 1985, abandoned. This application Apr. 29, 1987, Ser. No. 45,222

Claims priority, application Italy, May 28, 1984, 21129A/84

Int. Cl.[4] B21B *31/04, 31/08, 13/08*

U.S. Cl. 72—237 **10 Claims**



1. A convertible rolling stand comprising:

a bed frame;

intermediate holder bases having outwardly projecting portions, said outwardly projecting portions being configured and dimensioned to rest on and be removably secured to said bed frame;

four vertical tie rods rotatably housed in said intermediate holder bases, each said tie rod having upper and lower threaded sections protruding out of said holder bases;

upper and lower roll supports each rotatably supporting a horizontal roll, said upper roll support having nut seats securely housing threaded nuts corresponding to and engaging said upper threaded sections of said tie rods, said lower roll support having nut seats securely housing threaded nuts corresponsing to and engaging said lower threaded sections of said tie rods, said threaded nuts being non-rotating relative to said upper and lower roll supports;

drive means connected to said tie rods for rotating said tie rods relative to said roll supports, thereby causing said threaded nuts to be axially displaced on said tie rods such that said upper and lower roll supports are adjusted relative to each other; and

jack means engaging said upper and lower roll supports for urging said roll supports away from each other such that said roll supports are biased against said threaded nuts and tie rods.

4,715,207

APPARATUS FOR COVERING METALLIC BILLETS WITH ALUMINUM

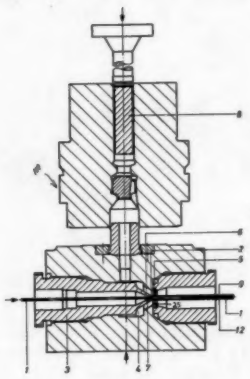
Johann Rudolph, Hanau, Fed. Rep. of Germany, assignor to Vacuumschmelze GmbH, Fed. Rep. of Germany

Filed Jun. 19, 1986, Ser. No. 875,957

Claims priority, application Fed. Rep. of Germany, Jun. 19, 1985, 3521850

Int. Cl.[4] B21C *23/24*

U.S. Cl. 72—268 **2 Claims**



1. In an apparatus for extruding a sheath onto a core, said core being selected from wires, cables, bands, pipes and the like, said sheath being composed of a material selected from a group consisting of aluminum and aluminum alloys, said apparatus having an extrusion chamber containing the material for the sheath, a nozzle projecting into the extrusion chamber and having a nozzle opening adapted to a cross section of the core and being aligned with a die opening in a die of the chamber with the die opening being adapted to the cross section of the finished extruded article, the improvements comprising means for producing friction between an inside surface of the nozzle opening and the surfaces of the core as the core passes through the nozzle opening of the apparatus, said means for forming friction comprising providing internal projections on a surface of the nozzle opening, said projections having a continual increasing height adjacent an end face of said nozzle.

4,715,208

METHOD AND APPARATUS FOR FORMING END PANELS FOR CONTAINERS

Joseph D. Bulso, Jr., Canton, and James A. McClung, North Canton, both of Ohio, assignors to Redicon Corporation, Canton, Ohio

Filed Oct. 30, 1986, Ser. No. 924,981

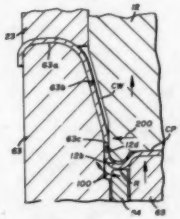
Int. Cl.[4] B21D *51/44*

U.S. Cl. 72—348 **6 Claims**

1. A method of forming a container end piece from a blank of material comprising the steps of:

(A) initially forming an end piece having a central panel and

a peripheral flange interconnected by a countersink radius adjacent said central panel and a tapered chuckwall leading from said flange to said radiused area with said wall being tapered toward said central panel for a portion of its



length and terminating in a vertical segment adjacent said radiused area; and

(B) reforming the end piece initially formed to reduce the radius while maintaining at least a portion of said vertical segment in a vertical condition.

4,715,209

CROWN CONTROL COMPENSATION CONTROLLING METHOD IN MULTIPLE ROLL MILL

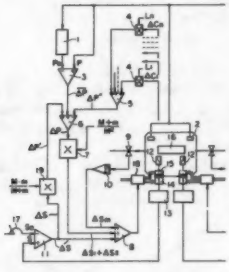
Hiroo Oshima, Kobe, Japan, assignor to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan

Filed Feb. 4, 1986, Ser. No. 825,981

Claims priority, application Japan, Jun. 6, 1985, 60-124000

Int. Cl.[4] B21B *37/12*

U.S. Cl. 72—366 **1 Claim**



1. A crown control compensation controlling method for controlling the position of at least one wedge in a multiple roll mill, said method comprising the steps of:

(a) detecting and storing an initial value P_0 of a rolling load;

(b) detecting the instantaneous value P of the rolling load;

(c) calculating the instantaneous rolling load variation $\overline{\Delta P}$ by subtracting the initial value P_0 of the rolling load from the instantaneous value P of the rolling;

(d) multiplying the crown control quantities $\Delta C_1, \Delta C_2, \ldots \Delta C_n$ at preselected control points by the coefficients of influence on rolling load $L_1, L_2, \ldots L_n$ and summing the products to obtain a rolling load variation $\Delta P''$;

(e) multiplying the instantaneous rolling load variation ΔP by the value

$$\frac{M+m}{M^2}$$

wherein M is the mill modulus of the rolling mill and m is the plasticity modulus of the rolling stock, thereby obtaining a value $\Delta S_1+\Delta S_2=\Delta S$, wherein ΔS is the roll gap control quantity and ΔS_1 and ΔS_2 are two portions into which the roll gap control quantity ΔS is divided;

(f) multiplying the roll gap control variation ΔS by an influence coefficient

$$\frac{Mm}{M+m},$$

wherein M and m are as defined previously to obtain the secondary rolling load variation $\Delta P'$;

(g) adding the instantaneous rolling load variation $\overline{\Delta P}$ and a secondary rolling load variation $\Delta P'$ and subtracting the rolling load variation $\Delta P''$ to obtain the instantaneous rolling load variation caused by entry plate thickness variation ΔP;

(h) measuring the instantaneous plate thickness;

(i) calculating the plate thickness variation ΔP;

(j) calculating a monitor component ΔS_m based on feedback of the plate thickness deviation;

(k) subtracting the initial roll gap S_0 between the upper and lower work rolls from the shift position S of the work rolls to obtain the roll gap variation ΔS;

(l) adding the monitor component ΔS_m to the roll gap control quantity $\Delta S=\Delta S_1+\Delta S_2$ and subtracting the roll gap variation ΔS; and

(m) controlling the position of at least one wedge in accordance with the value of the roll gap control quantity $\Delta S=\Delta S_1+\Delta S_2$.

4,715,210

METHOD FOR MAKING STEERING RACK BARS

Arthur E. Bishop, 17 Burton St., Mosman, New South Wales, Australia (2088); Klaus J. Roeske, 54 Ponyara Rd., Beverley Hills, New South Wales, Australia, and David W. Scott, 7 Solitary Pl., Ruse, New South Wales, Australia (2560)

Division of Ser. No. 572,424, Jan. 4, 1984, Pat. No. 4,571,982. This application Jan. 16, 1986, Ser. No. 819,291

Claims priority, application Australia, Jun. 4, 1982, PF4309; PCT Int'l Appl., Jun. 2, 1983, PCT/AU83/00073

Int. Cl.[4] B21J *7/18*; B21K *1/76, 7/12*

U.S. Cl. 72—400 **4 Claims**

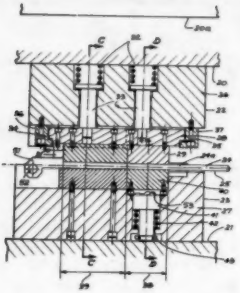
1. A method of making a steering rack bar having a Y-form rack portion and a cylindrical portion from a blank by forging comprising the following steps:

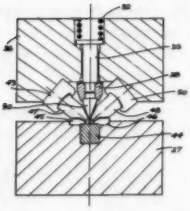
(a) producing an accurately shaped generally cylindrical blank the diameter of which is substantially equal to that of the cylindrical portion of the steering rack bar;

(b) holding the cylindrical portion in the die of a press and subjecting a portion thereof to a forging operation to produce a Y-form rack portion, in a part of said die having a group of at least three relatively movable forming elements;

(c) during said forging operation causing said elements to converge on the blank one of said elements acting to form teeth on a face thereof and at least two other of said elements acting to form two longitudinally extending guiding faces of the Y-form rack portion on an opposite face, the elements being moved in such a manner that as the die closes the said other elements effect a synchronized rolling motion while converging on the blank, the said other elements forcing material into cavities in the said one

element corresponding in shape to the teeth to be formed, from two directions simultaneously thereby focusing and





intensifying the forming pressure within said cavities, removing the finished rack bar from the die.

4,715,211

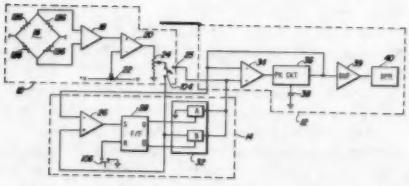
SINGLE PULSE PEAK CIRCUIT FOR TORQUE VERIFICATION

Ken Lehoczky, Livonia, Mich., assignor to GSE, Inc., Farmington Hills, Mich.

Filed Jun. 16, 1986, Ser. No. 874,533

Int. Cl.[4] G01L *25/00*

U.S. Cl. 73—1 C **5 Claims**



1. A method of measuring the torque generated by a fastening device which produces multiple torque spikes comprising the steps of:

a. monitoring the torque output of the fastening device as the torque increases and converting the torque output into a torque signal;

b. displaying the value of the highest torque signal received; and

c. when the torque output of the fastening device drops, preventing display of all subsequent increases in torque output of the fastening device.

4,715,212

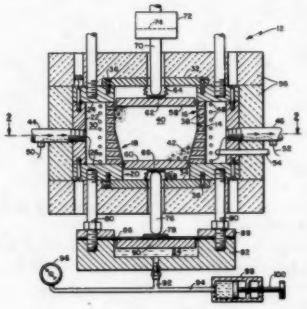
BULK SOLIDS PROPERTY TESTER

Jerry R. Johanson, San Luis Obispo, Calif., assignor to Jenike & Johanson, Inc., North Billerica, Mass.

Filed Apr. 24, 1986, Ser. No. 855,311

Int. Cl.[4] G01N *3/00*

U.S. Cl. 73—38 **15 Claims**



1. Testing apparatus for bulk solids comprising, in combination,

a test cell for containing the solids having a laterally enclosing wall converging from a first end toward a second end thereof, the cross sectional area of the first end exceeding the cross sectional area of the second end,

means for applying pressure to the solids over said area of the first end including means to increase said pressure and a sensor for measuring said pressure, and

means extending over said area of the second end, movable in the direction toward and away from the first end and adapted to confine the solids in the cell.

4,715,213

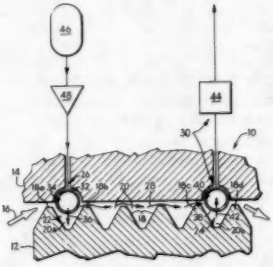
FLOW MEASUREMENT SYSTEM

William F. McGreehan, Fairfield, and Laurence T. Sherwood, Cincinnati, both of Ohio, assignors to General Electric Company, Cincinnati, Ohio

Filed Mar. 13, 1986, Ser. No. 839,840

Int. Cl.[4] G01M *3/20*

U.S. Cl. 73—40.7 **17 Claims**



1. A method for measuring the leakage flow rate of a gas stream through a seal, said seal being positioned between an upstream and downstream region of said gas stream to continuously block gas flow therebetween, said method comprising the steps of:

injecting a tracer gas at said upstream region;

mixing said tracer gas with said gas stream to form a mixed flow stream; and

detecting the concentration of said tracer gas in said mixed flow stream at said downstream region to determine said

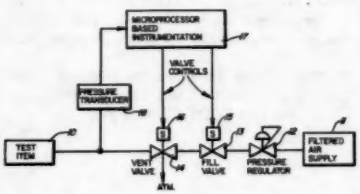
leakage flow rate of said gas stream through said seal, said mixed flow stream at said upstream and downstream regions being substantially identical in its chemical composition.

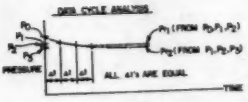
4,715,214

LEAK TESTER

Richard S. Tveter, Barrington, and Wayne A. Miller, Elgin, both of Ill., assignors to S. Himmelstein and Company, Hoffman Estates, Ill.

Filed Oct. 3, 1986, Ser. No. 914,925
Int. Cl.[4] G01M *3/26*
U.S. Cl. 73—49.2 16 Claims





9. The method of testing fluid receptors for leaking comprising the steps of:

providing pressurized fluid into a chamber of the fluid receptor;

isolating said chamber subsequent to provision of the fluid thereinto;

sensing the pressure of the fluid in said isolated receptor;

sequentially determining the sensed pressure at at least four different times during a stabilization period following the isolation of the chamber during which period the pressure in said isolated chamber changes exponentially due to a stabilization of the pressurized fluid therein toward a substantially constant value;

calculating from a first group of at least three successive pressure determinations a first end pressure to which the fluid pressure should change after infinite time and calculating from a second, subsequent group of at least three successive pressure determinations a second end pressure to which the fluid pressure should attain after infinite time;

comparing said first and second calculated end pressures and determining a differential therebetween;

determining a characteristic of the exponential curve defining the rate of the pressure change due to the stabilization of the pressurized fluid; and

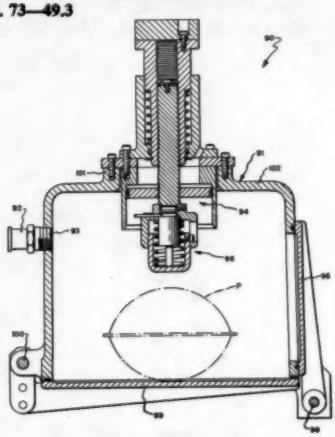
calculating the leak rate from the value of the determined characteristic and the determined pressure differential.

4,715,215

METHOD AND APPARATUS FOR TESTING THE FLUID-TIGHT SEALED INTEGRITY OF A HERMETICALLY-SEALED PACKAGE IN A RAPIDLY-STABILIZED ENVIRONMENT

John M. Perhach, Amherst; Charles E. Porter, Jr., Niagara Falls, and David C. Maloney, Alden, all of N.Y., assignors to The Aro Corporation, Bryan, Ohio

Continuation-in-part of Ser. No. 727,128, Apr. 25, 1985, abandoned. This application Oct. 2, 1986, Ser. No. 914,239
Int. Cl.[4] G01M *3/02*
U.S. Cl. 73—49.3 3 Claims



1. A leak detector for testing the fluid-tight sealed integrity of a hermetically-sealed package, comprising:

an enclosure;

a package-to-be-tested arranged within said enclosure, said package having a wall enclosing a chamber therewithin, a portion of said wall being movable in response to a pressure differential thereacross;

a vacuum pump selectively operable to reduce the pressure within said enclosure for permitting the fluid within said chamber to expand and for permitting said wall portion to move;

an actuator mounted on said enclosure, said actuator having a cylinder mounted on said enclosure and having a piston operatively arranged in said cylinder for sealed sliding movement therealong toward and away from said wall portion, said cylinder having a first stop arranged to limit further movement of said piston toward said package and having a second stop arranged to limit further movement of said piston away from said package, said piston having one face continuously exposed to the pressure within said enclosure and having its opposite face continuously exposed to atmospheric pressure, said actuator also including a spring acting between said piston and cylinder and urging said piston to move away from said package, said actuator being in a first position relative to said enclosure when the pressure within said enclosure is at atmospheric pressure and being in a second position relative to said enclosure when the pressure within said enclosure is at a predetermined negative pressure;

a sensor mounted on said actuator and operatively arranged to sense displacement of said first wall portion when said actuator is in said second position and when the pressure within said enclosure is further reduced below said predetermined negative pressure, said sensor being operable to provide a signal as a function of such sensed displacement of said first wall portion; and

a first comparator arranged to compare said sensor signal with a predetermined value, and operable to provide one signal if said sensor signal is greater than said predeter-

mined value and another signal if said sensor signal is less than said predetermined value.

4,715,216

PROCESS AND APPARATUS FOR THE CHROMATOGRAPHIC DETERMINATION OF COMPONENTS IN SPECIMENS

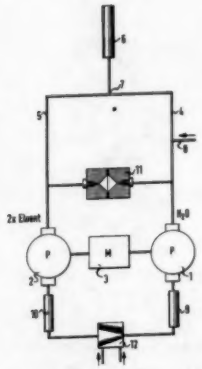
Klaus P. Müller, Jülich, Fed. Rep. of Germany, assignor to Kernforschungsanlage Jülich Gesellschaft mit beschränkter Haftung, Jülich, Fed. Rep. of Germany

Filed Nov. 19, 1985, Ser. No. 799,491

Claims priority, application Fed. Rep. of Germany, Nov. 19, 1984, 3442227

Int. Cl.⁴ G01N *31/08*

U.S. Cl. 73—61.1 C **19 Claims**



1. In a process for the determination of component concentrations down to the ppb (1 part per 10^9 parts) range of a liquid specimen by chromatography separating said components in a separation column by means of an eluent stream of adapted special concentration, said specimen being at once introduced into the liquid stream to the separation column, the improvement comprising the steps of:

providing a stream of said eluent with a concentration higher than said adapted special concentration for chromatographic separation; and

mixing said higher concentrated eluent stream with a necessary stream of extra-pure solvent to achieve said adapted special concentration when introducing the mixed streams into said separation column;

said liquid specimen being added to said extra-pure solvent stream, just before mixing.

4,715,217

DETERMINING ORGANIC COMPOUNDS USING A MEMBRANE

Brenton S. Coyne; Andrew J. Strandjord; Mark W. Spence; Reid S. Willis; Robert A. Bredeweg, and Timothy S. Stevens, all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 742,151, Jun. 6, 1985. This application Sep. 4, 1986, Ser. No. 903,535

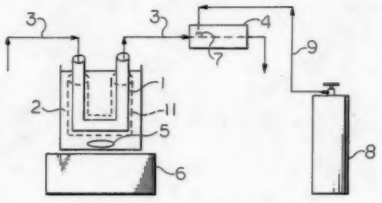
Int. Cl.⁴ B01D *15/08*

U.S. Cl. 73—61.1 C **14 Claims**

1. In a membrane assisted analytical chemical method for the determination of the concentration of an organic compound in an aqueous matrix wherein said concentration is greater than the solubility limit of said compound in water, comprising the steps of:

(a) adding an emulsifying agent to said matrix to essentially completely emulsify said organic compound;

(b) partitioning said matrix from a receiving fluid with said membrane, said membrane permeable to at least a detectable amount of said compound; and



(c) determining the concentration of said compound dispersed in said receiving fluid.

4,715,218

METHOD OF DETERMINING DEGREE OF EMBRITTLEMENT OF LOW ALLOY STEEL

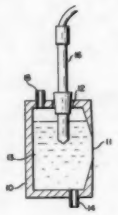
Noriko Sato, Tokyo, and Masayuki Suzuki, Yokohama, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jul. 29, 1986, Ser. No. 890,281

Claims priority, application Japan, Mar. 25, 1986, 61-64707

Int. Cl.⁴ G01N *17/00, 27/00*

U.S. Cl. 73—86 **24 Claims**



20. An apparatus for determining a degree of embrittlement which is caused by a thermal history of a low alloy steel, comprising an envelope containing therein an aqueous solution of an aromatic compound having a nitro group and at least one of a hydroxyl group and a carboxyl group, said envelope having an opening through which said aqueous solution contacts the low alloy steel, and a reference electrode which is brought into contact with said aqueous solution.

4,715,219

ACOUSTIC CALIBRATION DEVICE

Erling Frederiksen, Holte, Denmark, assignor to Aktieselskabet Bruel & Kjaer, Naerum, Denmark

Filed Jul. 28, 1986, Ser. No. 891,218

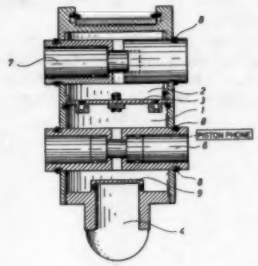
Claims priority, application Denmark, Sep. 23, 1985, 4310/85

Int. Cl.⁴ G01H *17/00*; G01M *19/00*; G01D *21/00*

U.S. Cl. 73—1 DV **11 Claims**

1. An acoustic calibration device for intensity measuring systems comprising at least two pressure microphones (6,7) and at least two cavities, wherein the cavities are interconnected by means of at least one acoustic resistance element (3),

one of the pressure microphones (6) being insertable into one of the cavities (1) and the remaining pressure microphones (7)



being insertable into one of the remaining cavities (2), and a sound source being connected in the said one cavity.

4,715,220

THROTTLE VALVE OPENING SENSOR

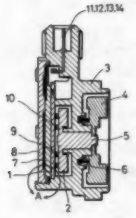
Kenji Eitoku, and Kenji Hayashi, both of Obu, Japan, assignors to Aisan Kogyo KK, Obu, Japan

Filed Nov. 20, 1986, Ser. No. 932,590

Claims priority, application Japan, Dec. 5, 1985, 60-187907[U]

Int. Cl.⁴ G01D *11/24*

U.S. Cl. 73—118.1 **2 Claims**



1. In a throttle valve opening sensor including a substrate provided with a throttle valve opening detecting portion, a rotor adapted to be rotated in association with rotation of a throttle valve, a housing for rotatably supporting said rotor and incorporating said substrate, a packing mounted in said housing for sealing said substrate, and a contact mounted on said rotor and adapted to slide on said opening detecting portion; the improvement comprising a substrate pressing portion formed at said packing for inwardly pressing said substrate, an O-ring projecting portion formed at said packing on the outer peripheral side of said substrate pressing portion and tightly contacting with said housing, and a cover provided outside said packing for inwardly pressing said substrate pressing portion and said projecting portion of said packing.

4,715,221

MOLD CAVITY VOLUME MEASURING APPARATUS

Conrad M. Grims, Golden, and Lawrence B. Eldridge, Littleton, both of Colo., assignors to Adolph Coors Company, Golden, Colo.

Filed Aug. 5, 1986, Ser. No. 893,149

Int. Cl.⁴ G01F *17/00*

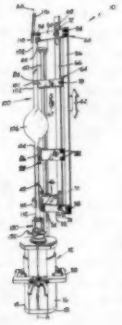
U.S. Cl. 73—149 **4 Claims**

4. An apparatus for measuring the volume of the cavity of a mold of the type used for blow molding having a plurality of relatively small dimension air passageways in fluid communication with the mold cavity for venting air from the cavity during molding and having a single opening into the mold cavity for enabling the injection of air into the cavity during molding, the cavity opening being associated with an outer interfacing surface of the mold which is adapted to sealingly interface with an air blowing assembly, the apparatus comprising:

(a) extensible membrane enclosure means, having a single enclosure opening therein and being insertable into said mold cavity through said mold cavity opening for expandably receiving a volume of liquid therein in totally filling relationship with said mold cavity and in nonfilling relationship with said air passageways;

(b) liquid-holding means in selectively openable and closeable fluid communication with said extensible membrane enclosure means for receiving and holding a selected volume of liquid during a first holding state and for discharging a portion of said selected volume of liquid into said extensible membrane enclosure means and holding the remaining portion of said selected volume of liquid during a second holding state; wherein said liquid-holding means comprises a transparent column with a predetermined cross sectional configuration wherein the linear distance between the liquid level in said first holding state and the liquid level in said second holding state is indicative of the volume of liquid discharged from said liquid-holding means to said extensible membrane enclosure means;

(c) said liquid-holding means comprising valve means for



enabling holding of said selected volume of liquid therein and for enabling discharge of a portion of said selected volume of liquid therefrom into said extensible membrane enclosure means;

(d) connector means for sealingly connecting said extensible membrane enclosure means with said viewable liquid-holding means and having a fluid passage way therein extending between said valve means and said extensible membrane enclosure means;

(e) liquid supply means for selectably supplying liquid to said liquid-holding means;

(f) measuring means operatively associated with said liquid-holding means for measuring the difference in the volume of liquid in said liquid-holding means between said first holding state and said second holding state; wherein said measuring means is calibrated to account for said volume of said liquid in said fluid passageway between said valve means and said extensible membrane enclosure means and for said volume of the membrane of said extensible membrane enclosure means; wherein said measuring means comprises metered distance means having a first register indicia adapted to be aligned with the liquid level position of said liquid-holding means during said first liquid-holding state and having a second register indicia adapted to be positioned proximate the liquid level position of said liquid-holding means during said second liquid-holding state, said first register indicia and said second register indicia being spaced apart by a fixed preselected distance which is

representative of a preselected measuring volume approximately equal to the volume of the mold cavity being measured; whereby, when the actual volume of said mold cavity is equal to said preselected measuring volume, said lower register mark is positioned in exact alignment with said liquid level in said liquid-holding means in said second holding state; and whereby, when the actual volume of said mold cavity is different from said preselected measuring volume, said lower register mark is positioned in offset relationship with said liquid level in said second-holding state, the offset distance being proportional to the difference in volume between the actual volume of said mold cavity and said preselected measuring volume; further comprising scale indicia associated with said second register indicia for measuring the distance between the second register indicia and the liquid level of said liquid-holding means in said second holding state for determining the difference between the actual volume of the mold cavity and said preselected measuring volume; wherein said metered distance means is slidingly moveable relative said liquid-holding means for enabling said first register indicia to be moved into alignment with said liquid level in said first holding state;

(g) membrane positioning and sealing means for positioning an upper portion of said extensible membrane enclosure means proximate the opening thereof in sealed relationship with interfacing surface of said mold whereby said extensible membrane is expandable into the entire volume of said mold cavity and only into said mold cavity by said liquid discharged into said extensible membrane from said liquid-holding means; wherein said membrane positioning means comprises:

slide means for enabling sliding movement of said connector means and said extensible membrane enclosure means attached thereto in a direction substantially in axial alignment with a central axis of said mold cavity opening;

interfacing surface means on said connector means adapted to abut with said interfacing surface of said mold whereby an annular portion of said extensible membrane enclosure means positioned proximate the opening of said extensible membrane enclosure means is sealingly engaged between said interfacing surfaces of said connector means and said mold cavity when said surfaces are urged into abutting relationship by sliding movement of said slide means;

(h) whereby the volume of said mold cavity is equal to the difference in the volume of liquid in said liquid-holding means between said first holding state and said second holding state plus the volume of the membrane of said extensible membrane enclosure means extending into said mold cavity less the volume of liquid positioned in said fluid passageway between said valve means and said extensible membrane enclosure means.

4,715,222

PRESSURE GAUGE

Tien-Tsai Huang, No. 4, Lane 30, Wu Chuan Street, Panchiao City, Taiwan

Filed Dec. 8, 1986, Ser. No. 938,886

Int. Cl.[4] B60C *23/02*; G01L *7/16*

U.S. Cl. 73—146.8 **5 Claims**

1. A pressure gauge for measuring the pressure inside of a tire comprising:

a housing having an indicating board on one side thereof;

an axle rotatably mounted in said housing;

a pinion member fixedly mounted on said axle;

an indicator for displaying the degree of rotation of said axle;

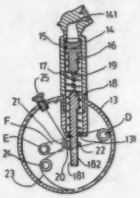
a tube member including an inner end extending inwardly of said housing and in vertical position relative to the axis of said axle, and an outer end extending outwardly of said housing, adapted to communicate with the inside of the tire;

a movable member sealingly disposed in the outer end of said tube member for being forced by the air pressure inside of the tire;

a compression spring disposed in said tube member, biasing said movable member against the pressure exerted on said movable member;

a rack member disposed movably in said tube member and having alower end extending outwardly of said tube member so as to mesh with said pinion member;

a tension spring connecting said movable member with said rack member;



a blocking member normally brought into engagement with the surface of said axle to create a friction force therebetween when said axle is driven to rotate by said rack member as said movable member is forced downwardly by the air pressure, wherein the friction force is adjusted higher than tension force of said tension spring when said tension spring is at its most tensed state; thereby, only when said blocking member is released from said axle, will said rack member be pulled by the tension spring to its original position.

4,715,223

DEVICE FOR TESTING PROPERTIES OF COINS

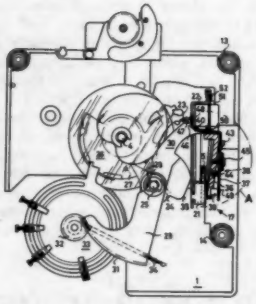
Bernhard Kaiser, and Ortwin Wokoeck, both of Villingen-Schwenningen, Fed. Rep. of Germany, assignors to Kienzle Apparate GmbH, Villingen-Schwenningen, Fed. Rep. of Germany

Filed Mar. 26, 1985, Ser. No. 716,033

Claims priority, application Fed. Rep. of Germany, Mar. 28, 1984, 3411347

Int. Cl.[4] G01D *5/00*

U.S. Cl. 73—163 **7 Claims**



1. Device for testing for magnetism and diameter coins in coin operated apparatus such as parking meters, comprising an upwardly extending coin guiding duct having an upwardly extending side wall and a lower end, a coin support means provided at said lower end of said coin guiding duct, a rocker lever having first and second arms, an adjustable set screw attaching said rocker lever to said side wall, a testing segment for carrying out a coin diameter testing step when a coin rests on said coin support means, a permanent magnet mounted on said first arm of said rocker lever, said magnet extending to the

range of a coin resting on said support means, so that the magnet is attracted by the coin if the coin is ferromagnetic, whereby said first arm of said rocker is moved toward the coin, said second arm comprising a locking bracket capable of engaging or being disengaged from said testing segment, depending on whether said first arm is moved toward the coin.

4,715,224

METHOD AND APPARATUS FOR MEASURING THE MASS OF A FLOWING MEDIUM

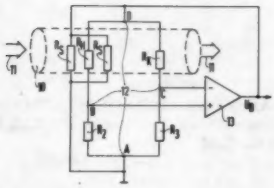
Ulrich Kuhn, Renningen, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Jan. 27, 1986, Ser. No. 822,519

Claims priority, application Fed. Rep. of Germany, Feb. 7, 1985, 3504082

Int. Cl.[4] G01F *1/68*

U.S. Cl. 73—204 7 Claims



1. A method for measuring the mass of a medium having an ambient temperature and flowing through a housing, in particular for measuring an air mass aspirated by an internal combustion engine, comprising the steps of:

applying a first film to a portion of a surface of a substantially rectangular substrate having a longitudinal extent to form at least one temperature- dependent resistor having sides,

disposing along said longitudinal extent of the substrate and on opposite sides of the at least one temperature-dependent resistor respective second films to form protective heating resistors having greater length than said at least one temperature-dependent resistor,

orienting said film on said surface so that said at least one temperature-dependent resistor is disposed substantially medially of terminal portions of the substrate,

disposing at least one of said terminal portions in a metallic, thermally-conductive support means for thermal contact therewith,

further disposing said support means so that the at least one temperature-dependent resistor lays transversely to a flow direction of said medium and said terminal portions are exposed thereto,

connecting a resistance detection device having a regulating function to said at least one temperature-dependent resistor to form a closed loop for detecting a resistance value of the at least one temperature-dependent resistor,

regulating the at least one temperature-dependent resistor to a predetermined resistance temperature by varying a supply of energy thereto, and

maintaining said protective heating resistors at a temperature that approximates said predetermined resistance temperature of the at least one temperature-dependent resistor,

whereby the at least one terminal portion of the substrate may be maintained at substantially the temperature of the medium.

4,715,225

FLOW METER FOR MEASURING THE FLOW RATE OF LIQUID

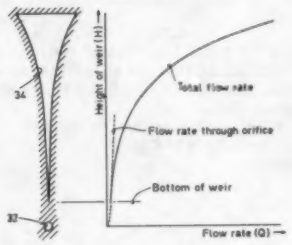
Yoshihiko Hasegawa, and Osamu Miyata, both of Hyogo, Japan, assignors to TLV Co., Ltd., Tokyo, Japan

Filed Jul. 25, 1985, Ser. No. 759,077

Claims priority, application Japan, Aug. 9, 1984, 59-167410

Int. Cl.[4] G01F *1/20*

U.S. Cl. 73—215 6 Claims



1. A flow meter for measuring the flow rate of a liquid comprising a vertically elongated slit weir arranged to have said liquid flow therethrough and defining an upstream space on one side thereof, said flow meter being capable of detecting the liquid level in said upstream space with respect to said weir and determining the flow rate of the liquid on the basis of the relationship between said liquid level and the flow rate of the liquid that flows through the weir, wherein a width of said weir is designed so that a constant percentage variation in total flow rate causes a constant variation in liquid level at any liquid level.

4,715,226

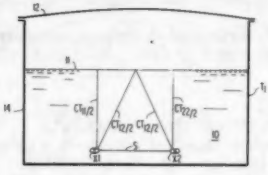
ULTRASONIC APPARATUS FOR DETERMINING THE AMOUNT OF LIQUID IN A CONTAINER OF KNOWN VOLUME

John A. Dorr, Crofton, Md., assignor to Xecutek Corporation, Annapolis, Md.

Filed Aug. 15, 1986, Ser. No. 896,972

Int. Cl.[4] G01F *23/28*

U.S. Cl. 73—290 V 2 Claims



1. In an ultrasonic apparatus for determining the volume of liquid in a container of known volume, comprising:

at least a pair of ultrasonic transducers, means mounting said pair of transducers a known distance apart relative to the liquid surface so that ultrasonic energy reflected from said liquid surface traverses the following paths:

(1) from a first of said transducers to the liquid surface,

(2) from a first of said transducers immediately to said surface then and to said second of said transducers,

means for measuring the time of travel T' of ultrasonic energy from said one transducer to said surface,

means for measuring the time of travel T of ultrasonic energy from said first of said transducers to the other of said transducers as reflected from said liquid surface,

means for computing the location of said surface of said liquid by solving:

$$H = \frac{ST}{2\sqrt{(T - T)(T + T)}}$$

where S equals the known distance between said pair of transducers, and

means for computing the volume of liquid therefrom.

4,715,227

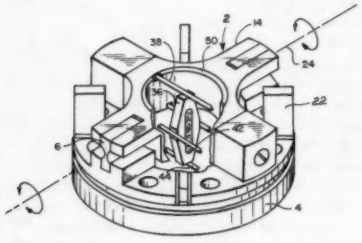
MULTISENSOR ASSEMBLY WITH ANGULAR RATE PIEZOELECTRIC CRYSTAL BEAM

Roland Pittman, Montclair, N.J., assignor to The Singer Company, Stamford, Conn.

Filed Sep. 2, 1986, Ser. No. 902,695

Int. Cl.[4] G01P *9/02*

U.S. Cl. 73—504 **13 Claims**



1. In a navigation sensor having a gyroscopic element rotatable about an axis and at least one flexure hinge for resiliently mounting the gyroscopic element to a base, the gyroscopic element including an aperture concentric to the axis, the navigation sensor further having a torque sensing assembly comprising:

a piezoelectric beam aligned in coaxial relationship with the axis;

first restraining means for fixing orthogonal to the axis one edge portion of the beam to the gyroscopic element;

second restraining means for fixing orthogonal to the axis an opposite edge portion of the beam to the base;

third restraining means intermediate to the first and second restraining means for fixing to the gyroscopic element opposite midsection portions of the beam orthogonal to the axis;

whereby the restrained beam converts an angular rate of the gyroscopic element to a corresponding electrical signal.

4,715,228

INSPECTION APPARATUS

Terry Livsey, and Graham T. Foulkes, both of Colne, England, assignors to Rolls-Royce plc, London, England

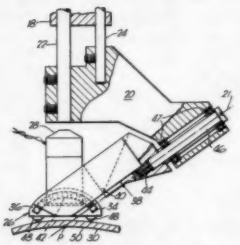
Filed Aug. 27, 1986, Ser. No. 900,694

Claims priority, application United Kingdom, Oct. 9, 1985, 8524854

Int. Cl.[4] G01N *29/04*

U.S. Cl. 73—640 **6 Claims**

1. A device which in operation carries a probe and is moved over a workpiece surface so as to enable assessment of the workpiece by the probe and comprising a cradle and a cradle supporting head, wherein the cradle is adapted and arranged so as to enable adjustable positioning of said probe thereon and said cradle including a surface adapted in use to face said workpiece surface and including means for spacing said surface of said cradle a predetermined distance from said workpiece surface, and means for mounting said cradle for rotational movement about a first axis which passes through the sensing point of the probe and means for mounting said cradle for movement about a second axis which intersects said first axis at a right angle and which passes through said sensing



point of said probe when a said probe is positioned on said cradle for operation.

4,715,229

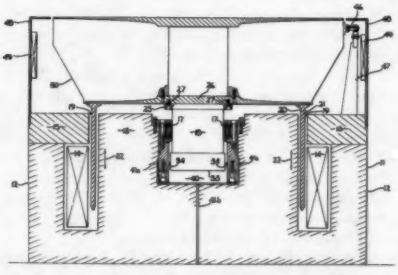
APPARATUS FOR VIBRATION TESTING

Gary Butts, Huntington Beach, Calif., assignor to Ling Electronics, Inc., Anaheim, Calif.

Filed May 5, 1986, Ser. No. 859,620

Int. Cl.[4] G01M *7/00*

U.S. Cl. 73—663 **10 Claims**



1. In a vibration testing device, including a reciprocative armature frame having means for mounting specimens thereon to be subjected to a spectrum of vibration test frequencies, said armature frame comprising:

an upper plate comprised of a first material and formed with a central region which is thicker than the outer region thereof;

a lower plate comprised of a second material;

an intermediate member comprised of a third material disposed between and coupled to said upper and lower plates to form a unitary structure, said intermediate member including a hollow core and a plurality of ribs disposed substantially perpendicular to said plates;

each of said first and second materials having a higher modulus of elasticity than said third material;

said third material having a lower mass density than said first and second materials; and

whereby undesirable resonant frequency ranges inherent within said device are shifted outside of the spectrum of vibration test frequencies.

4,715,230

PRESSURE REDUCING INSTRUMENT FOR PRESSURE GAUGES

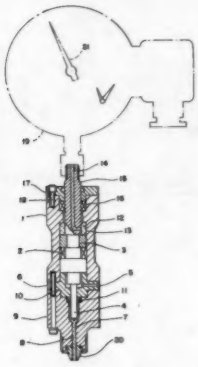
Hisao Tatsuzawa, Odawara, Japan, assignor to Yamaya Sangyo Co., Ltd., Kanagawa, Japan

Filed Aug. 26, 1985, Ser. No. 769,243

Claims priority, application Japan, May 13, 1985, 60-070268[U]

Int. Cl.[4] G01L 7/16

U.S. Cl. 73—706 1 Claim



1. A pressure reducing instrument for pressure gauges which comprises

a cylinder;

a piston inside the cylinder, said piston having a pressure receiving face which is impinged by a pressure fluid to be measured and a pressurizing face for contacting a pressure transmitting fluid,

the area of the pressurizing face being greater than the area of the pressure receiving face;

a bottom member secured to the bottom of the cylinder, the bottom member being provided with an introductory aperture, the introductory aperture beginning at one end of the exterior of the bottom member and terminating at its other end near the piston pressure receiving face whereby the pressure of the pressure fluid to be measured impinges the pressure receiving face;

an intermediate member interposed between the cylinder and the said bottom member;

the intermediate member comprising a central cavity, a portion of the piston being positioned within the central cavity.

the intermediate member being provided with an atmospheric conduit, the atmospheric conduit leading from the central cavity to the exterior periphery of the intermediate member;

the central cavity being positioned to introduce atmospheric pressure upon the piston intermediate its pressure receiving face and its pressurizing face;

whereby the said pressure transmitting fluid can be introduced into the pressure introductory portion of the pressure gauge at a pressure that is less than the pressure of the pressure fluid to be measured.

4,715,231

MAXIMUM PRESSURE INDICATOR

Leighton Lee, II, Guilford, and Robert J. Kolp, Ivoryton, both of Conn., assignors to The Lee Company, Westbrook, Conn.

Filed Nov. 20, 1986, Ser. No. 933,465

Int. Cl.[4] G01L 7/08

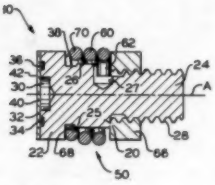
U.S. Cl. 73—709 15 Claims

1. A maximum pressure indicator comprising:

main body means adapted for insertion into a bore for forming a rigid body comprising a head and a cavity opening through said head;

bore securing means mounted to said main body means for engaging the surrounding wall of a bore to secure said main body means in fixed position in said bore; and

irreversibly deformable means bonded to said head to sealingly enclose said cavity and having a pressure sensing



surface for deforming from a reference state in response to pressure exerted against said sensing surface so that when said sensing surface is subjected to a pressure above a pre-established threshold, a portion of said deformable means is deformably deflected into said cavity a deflection distance relative to the portion position of said reference state which distance corresponds to the maximum pressure exerted against said sensing surface.

4,715,232

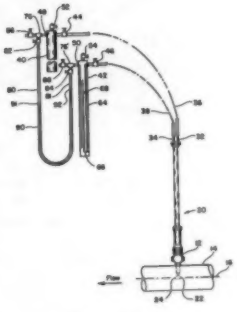
FLOW MEASURING SYSTEM WITH BACKFLOW PREVENTING MEANS

Carl F. Buettner, 9501 Pine Spray Ct., St. Louis, Mo. 63126

Filed Aug. 25, 1986, Ser. No. 900,186

Int. Cl.[4] G01F 1/37

U.S. Cl. 73—861.49 19 Claims



1. Means for measuring the flow of fluid in a conduit filled with a fluid under pressure comprising a conduit with fluid under pressure to be measured, means for responding to differential pressure at some location in the conduit including a sensing head having a pair of oppositely facing open ended orifices and a separate tube connected respectively to each orifice and extending therefrom through and from the conduit, a pair of normally upwardly oriented closed tubular chambers external of the conduit, each of said chambers having an input passage located near the upper end thereof in communication with a respective one of said tubes and an outlet passage, a supply of a first fluid filling each of said chambers, a U-shaped conduit in each of said chambers, each U-shaped conduit having one end connected to communicate with the input passage thereof and an opposite open end, said U-shaped conduits extending from adjacent to the upper end of the respective chamber downwardly to near the bottom of the chamber and then upwardly therefrom to a location in the chamber adjacent the upper end of said chamber, the outlet passage to each of the

chambers including a tubular member having a first open end that extends downwardly to a position in the chamber adjacent the lower end of said chamber and an upper end communicating with the outlet passage, a differential indicating tube having a first end connected to communicate with the outlet passage of one of said chambers and a second end connected to communicate with the outlet passage of the other of said chambers, said differential indicating tube having a downwardly extending loop portion partially filled with an indicating fluid, the remaining portion being filled with the first fluid, the differential pressure sensed at the oppositely facing open ended orifices producing a height differential between the opposite ends of the indicating fluid in the differential indicating tube.

4,715,233

SENSOR FOR MAGNETIC-INDUCTIVE FLOWMETERS

Jozef H. M. Neven, Meerssen; Boodewijn J. Poortman, Dortrecht; Wouter T. Tromp, Sliedrecht, all of Netherlands, and Udo Stevens, Moers, Fed. Rep. of Germany, assignors to Rheometron AG, Basel, Switzerland

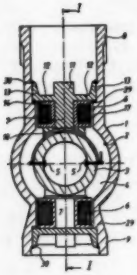
PCT No. PCT/EP86/00129, § 371 Date Oct. 14, 1986, § 102(e) Date Oct. 14, 1986, PCT Pub. No. WO86/05873, PCT Pub. Date Oct. 9, 1986

PCT Filed Mar. 10, 1986, Ser. No. 930,181

Claims priority, application Fed. Rep. of Germany, Mar. 27, 1985, 3511033

Int. Cl.⁴ G01F *1/58*

U.S. Cl. 73—871.12 **7 Claims**



1. A flow sensor for magnetic-inductive flowmeters comprising a housing including a first bore extending therethrough, a sensing tube disposed within the housing and extending through the first bore, sensing electrodes mounted to the tube, first and second electromagnetic coils mounted to the housing, each having a core including first and second flanges proximate respective ends of the core, one of the core ends being affixed to the housing and the other one of the core ends being in contact with the sensing tube, a bobbin for each coil constructed of a dielectric material defined by first and second, generally semi-cylindrical bobbin segments shaped so that the segments can be placed about an intermediate portion of the core located between the flanges, and a conductor wire wrapped about the semi-cylindrical bobbin segments.

4,715,234

SELF-CLEANING AND SELF-LUBRICATING FLUID FLOWMETER

Charles R. Allen, Katy, and Jack D. Harshman, Missouri City, both of Tex., assignors to Daniel Industries, Inc., Houston, Tex.

Filed Jul. 18, 1986, Ser. No. 886,732

Int. Cl.⁴ G01F *1/10*

U.S. Cl. 73—861.91 **20 Claims**

1. A self-cleaning and self-lubricating fluid flowmeter comprising:

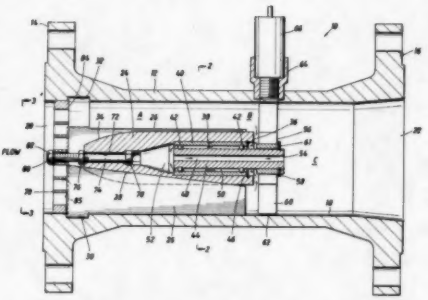
(a) body means adapted for connection into a flow line and forming an internal flow passage for a fluid medium to flow therethrough;

(b) a bearing support hub being immovably positioned with said internal flow passage and forming a bearing receptacle;

(c) a turbine rotor;

(d) a rotor shaft extending into said bearing receptacle and supporting said turbine rotor in immovable assembly therewith;

(e) bearing means disposed within said bearing receptacle and establishing rotatable support for said rotor shaft and



rotor, said bearing means and said rotor shaft cooperatively defining a flow path extending upstream from the downstream extremity of said bearing suport hub, passing through said bearing means, reversing direction and terminating at a location downstream of said downstream extremity of said bearing support hub;

(f) said bearing support hub being of a configuration for developing differential pressure responsive flow of said fluid medium through said flow path; and

(g) means developing signals responsive to fluid medium induced rotation of said turbine rotor.

4,715,235

DEFORMATION SENSITIVE ELECTROCONDUCTIVE KNITTED OR WOVEN FABRIC AND DEFORMATION SENSITIVE ELECTROCONDUCTIVE DEVICE COMPRISING THE SAME

Minoru Fukui, Toyomaka, and Naoki Katsoka, Kyoto, both of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Japan

Filed Feb. 28, 1986, Ser. No. 834,785

Claims priority, application Japan, Mar. 4, 1985, 60-41024; May 14, 1985, 60-100482; Sep. 30, 1985, 60-214664; Sep. 30, 1985, 60-214665

Int. Cl.⁴ G01L *1/18*; H01C *10/10*

U.S. Cl. 73—862.68 **48 Claims**

1. A stretch sensitive electroconductive woven fabric comprising a plural number of longitudinal yarns and lateral yarns constituting a fabric strip having a shape which is substantially rectangular, in which conductive yarns are used for one of the longitudinal or lateral yarns constituting said fabric and insulating yarns for the other, and the longitudinal yarns and lateral yarns constituting said fabric strip are slanted relative to the longer direction of the fabric strip, and wherein the woven fabric is deformable and has an electrical resistance that varies with the degree of deformation.

4,715,236

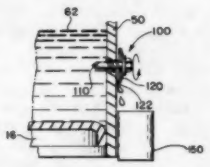
POWER TRANSFORMER INSPECTION PROCEDURE

Thomas E. Willert, Bellingham, Wash., assignor to Puget Sound Power and Light Company, Bellevue, Wash.

Filed Oct. 3, 1986, Ser. No. 914,883

Int. Cl.[4] G01N *1/00*

U.S. Cl. 73—863.86 **5 Claims**



1. A method for obtaining a fluid sample from an electrical transformer of the type having a top and a bottom joined by a continuous wall so as to form a sealed vessel, the continuous wall having an inner wall surface enclosing primary and secondary windings positioned above the transformer bottom and a dielectric fluid, and an outer wall surface supporting secondary bushings, including a neutral secondary bushing, comprising the following steps:

locating a position on the outer wall surface between the neutral secondary bushing and the transformer bottom, and below the primary and secondary windings;

forming a bore at the located position partially through the continuous wall so that a reduced thickness wall portion remains adjacent to the inner wall surface;

placing a self-tapping screw, having a drilling end, a threaded midsection with a relatively constant diameter, a driving end, and a head for sealing the bore, into the bore;

rotating the driving end of the screw to advance the drilling end through the rediced thickness wall portion and to penetrate the inner wall surface until the sealing means seals the bore; and

counterrotating the driving end of the screw until the fluid exits the bore to obtain the sample.

4,715,237

PROCESS AND APPARATUS FOR QUANTITATIVE AND/OR QUALITATIVE ANALYSIS OF LIQUIDS

Karl Kaempf; Paul Zaehner, and Wolfgang Richter, all of Herisau, Switzerland, assignors to Metrohm AG

PCT No. PCT/CH85/00105, § 371 Date Feb. 12, 1987, § 102(e) Date Feb. 12, 1987, PCT Pub. No. WO86/00703, PCT Pub. Date Jan. 30, 1986

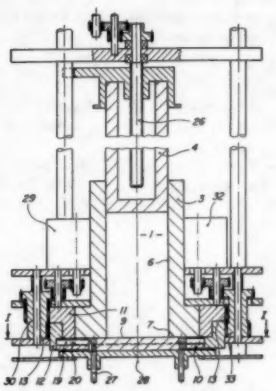
PCT filed Jul. 1, 1985, Ser. No. 848,404

Claims priority, application Switzerland, Jul. 6, 1984, 3280/84; Mar. 18, 1985, 1188/85

Int. Cl.[4] G01N *1/14*

U.S. Cl. 73—864.62 **1 Claim**

1. An apparatus for the qualitative and quantitative analysis of liquids, comprising means defining a chamber for receiving liquids, adjustable means for varying the volume of the chamber, the means defining the chamber including at least two ducts capable of opening into the chamber for feeding and dischanging the liquids, the means defining the chamber comprising at least two wall portions, one of the wall portions being displaceable relative to the other wall portion independently of the adjustment of the means for varying the chamber volume, the at least two ducts arranged in one of the wall portions, shut-off means for closing and opening the ducts capable of opening into the chamber, the shut-off means being formed in one of the wall portions by a single surface area facing the ducts, the shut-off means and the one wall in which the at least two ducts are arranged being displaceable relative to each other between first and second positions, at least one of the at least two ducts being closed by the shut-off means in the first position with another of the at least two ducts opening into the chamber, while in the second position, the at least one of the ducts opens into the chamber with the another of the ducts being closed by the shut-off means whereby the liquids in the chamber can be ejected fully through one of the at least two ducts while the another of the at least two ducts is not in communication with the chamber, one of the two wall portions being a cylinder having an end face, and the means for varying the volume of the chamber being a piston slidably received in the cylinder, wherein the displaceable wall portion is a cylinder end member facing the end face of the cylinder, the ducts capable of opening into the chamber being arranged in the displaceable wall portion at the end of the cylinder, the cylinder end member forming the displaceable wall portion bearing sealingly against the end face of the cylinder, the ducts in the displaceable wall portion defining openings in the surface area of the wall portion facing the interior of the chamber, and the openings being closeable by the end face of the cylinder, a plurality of separate ducts defining openings being arranged so



as to be located in a circle in the cylinder end member, such that all openings are closeable by the end face of the cylinder, and that at least one opening can be opened by displacing the cylinder end member relative to the longitudinal axis of the cylinder, wherein the cylinder end member is a circular disc comprising a control disc in which the circular disc is disposed in a plane-parallel relationship in such a way that the control disc is rotatable about the circular disc, a rotary ring to which the control disc is connected in such a way that the control disc is not rotatable relative to the rotary ring, but is displaceable in the plane of the circular disc, a wedge-action disc engaging the control disc for displacing the control disc together with the circular disc, the wedge-action disc being rotatable about the axis of the cylinder together with the rotary ring for positioning the control disc, and the wedge-action disc being rotatable about the axis of the cylinder while the rotary ring remains stationary for displacing the circular disc.

4,715,238

STARTER DEVICE FOR INTERNAL COMBUSTION ENGINES

Guido Bernardi, Milan, Italy, assignor to B.C.S. S.p.A., Milan, Italy

Filed Nov. 24, 1986, Ser. No. 934,018

Claims priority, application Italy, Nov. 25, 1985, 22979 A/85

Int. Cl.[4] F02N *5/02*; F03G *1/00*

U.S. Cl. 74—6 **13 Claims**

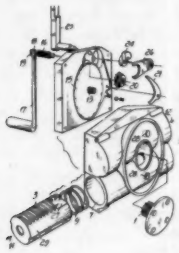
1. Starter device for an endothermal engine having a motor shaft, comprising:

a first pinion to be connected axially directly to the motor shaft of the endothermal engine;

a pair of slideable racks for engaging said first pinion on opposite sides thereof;

a pair of spring means, each engaging one of said two racks,

the direction of thrust of the first of said springs against its respective rack being opposite to the direction of thrust of the second of said springs against the respective rack;



manual start up means; and

a second pinion engaging said two racks and operated by the manual startup means.

4,715,239

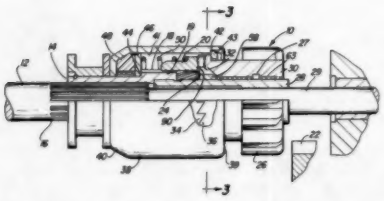
ENGINE STARTER GEARING

Paul F. Giometti, Horseheads, N.Y., assignor to Facet Enterprises, Inc., Tulsa, Okla.

Continuation-in-part of Ser. No. 575,199, Jan. 30, 1984, Pat. No. 4,611,499. This application Sep. 15, 1986, Ser. No. 907,485

Int. Cl.[4] F02N *11/00*

U.S. Cl. 74—6 **9 Claims**



1. An engine starter gearing for selectively starting an engine having a starting gear, said engine starter gearing comprising:

a power shaft;

a sleeve slidably, but non-rotatably, secured to said power shaft, said sleeve having external helical splines formed on one extremity thereof;

a pinion gear slidably journalled to said power shaft for axial movement relative thereto, said pinion gear being adapted for movement into and out of engagement with said starting gear of said engine to be started;

a driven clutch member secured to said pinion gear for movement therewith, said driven clutch member having a conical surface and a circular recess formed radially outwardly of said surface;

a driving clutch member slidably mounted on said helical splines of said sleeve, said driving and driven clutch members having complementary mutually engageable inclined teeth for transmitting torque therebetween in one direction of relative rotation;

a barrel housing having an open end, said barrel housing being slidably supported on said sleeve and at least partially spatially encompassing said driving and driven clutch members;

abutment means disposed within said barrel housing adjacent said open end thereof, said abutment means being adapted for engagement with said driven clutch member for confining said driving and driven clutch members within said housing;

resilient means disposed within said barrel housing, said resilient means abutting said driving clutch member, said resilient means further biasing said driving and driven clutch members into mutual engagement;

a radially inwardly extending shoulder formed on said driving clutch member adjacent said circular recess of said driven clutch member;

a plurality of centrifugal flyweight members annularly arranged within said circular recess, said plurality of centrifugal flyweight members each having an inclined surface abutting said conical surface of said driven clutch member, said plurality of centrifugal flyweight members being operative to displace said driving clutch member in said first axial direction in response to centrifugal force; and

a plurality of cavities formed in said driven clutch member, said plurality of cavities each extending from said circular recess, each of said cavities of said plurality of cavities slidably receiving at least a portion of an associated centrifugal flyweight member of said plurality of centrifugal flyweight members to prevent circumferential movement of said plurality of centrifugal flyweight members while permitting radial movement thereof.

4,715,240

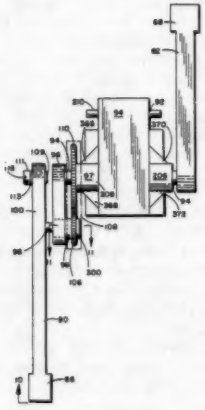
PUMPING DEVICE

Richard R. Erich, Jackson, Calif., assignor to George F. Bethel and Patience K. Bethel, both of Newport Beach, Calif., a part interest

Continuation-in-part of Ser. No. 443,758, Feb. 7, 1983, abandoned. This application Aug. 29, 1985, Ser. No. 770,859

Int. Cl.[4] F16H *21/36*

U.S. Cl. 74—52 **22 Claims**



1. A pumping unit for pumping a rod type pumper wherein a rod is connected to a pump within a well comprising:

a gear reducer having a high speed input shaft connected to reduction gears therein for turning a lower speed output shaft;

a first member connected to said output shaft for rotation around the axis of said output shaft,

a second member connected for rotation on said first member having rotatable means for connection to a rod pumper wherein said distance between the axis of rotation of said first member to the axis of rotation for the second member is substantially equal to the distance between the axis of rotation of said second member and said means for connection to said rod pumper;

a fixed gear means surrounding the axis of rotation of said first member;

a rotatable gear connected to said second member for rotational driven movement of said second member around its rotational axis of connection;

gear means connected between said fixed gear means and

rotatable gear of a size related to said fixed gear means and said rotatable gear to provide timed movement of the rotation of said rotatable gear so as to cause the second member to which said rotatable gear is connected to rotate in reverse rotational movement from said first member but at the same rotational speed as said first member;

counterbalance means connected to said second member to lessen forces seen by said fixed gear means and said rotatable gear; and,

means substantially surrounding both of said gear means for housing said gear means.

4,715,241

MECHANICAL LINEAR DRIVE SYSTEM

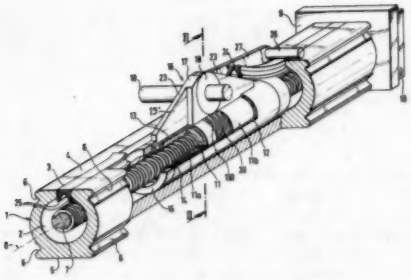
Reinhard Lipinski, Plochingen, and Siegmund H. Kaiser, Nürtingen, both of Fed. Rep. of Germany, assignors to PROMA Produkt-und Marketing Gesellschaft mbH, Plochingen, Fed. Rep. of Germany

Filed Feb. 28, 1986, Ser. No. 834,896

Claims priority, application Fed. Rep. of Germany, Mar. 2, 1985, 3507497

Int. Cl.[4] F16H *29/02*

U.S. Cl. 74—89.15 **14 Claims**



1. Mechanical linear drive system comprising

a threaded spindle (**7**) having at least two coaxial spindle portions (*7a, 7b, 7c*) each of which define end portions;

spaced bearing means (**9**) mounting the end portions, at least one of the space bearing means being a rotatable bearing, at least one spindle portion (*7a, 7b*) is free to rotate in the bearing means to form a rotatable spindle portion;

at least one spindle motor drive (**10***a*, **10***b*, **10***c*) coupled to the at least one rotatable spindle portion;

a tubular structure (**1**) having two ends, and formed with an axial linear slit (**3**), said tubular structure circumferentially surrounding the spindle (**7**), with clearance, the spaced bearing means being secured to the tubular structure ends

means retaining the spaced bearing means in axially fixed position,

said spaced bearing means closing off the ends of the tubular structure;

at least one internally and externally threaded spindle nut (**11**) located on and coupled to each of said threaded spindle portions (**71**, *7b*) by the internal threading of said nut;

a force transfer element (**16**) associated with and coupled to each one of said spindle nuts (**11**), the force transfer element (**16**) extending outwardly of the tubular structure through said slit (**3**);

an individual drive means (**21**) associated with each force transfer element (**16**);

a gearing mean (**18**, **20**) on each force transfer element drivingly coupling the respective individual spindle motor drive means (**21**) to the external threading of said spindle nut (**11**),

and having means to couple each spindle nut (**11**) and the associated force transfer element (**16**) together in a manner permitting rotation of the spindle nut with respect to the associated force transfer element while inhibiting relative axial movement between the respective spindle nut (**11**) and the associated force transfer element (**16**).

4,715,242

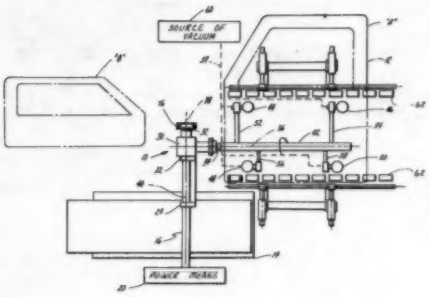
APPARATUS FOR TURNING A WORKPIECE OVER ALONG A TWISTING PATH OF MOTION

Irvin D. Bond, 5970 Wall St., Sterling Heights, Mich. 48077

Continuation-in-part of Ser. No. 714,844, Mar. 22, 1985, Pat. No. 4,676,113. This application Feb. 14, 1986, Ser. No. 829,165

Int. Cl.[4] F16H *21/44*

U.S. Cl. 74—102 **13 Claims**



1. Apparatus for turning a workpiece over along a twisting path of motion, comprising:

a base;

a turnover shaft mounted on the base, and power means for rotating the turnover shaft about a first axis of rotation between first and second rotated positions;

workpiece support means mounted on the turn-over shaft so as to be rotated therewith about said first axis of rotation, the workpiece support means being so mounted on the turnover shaft as to be rotatable with respect to the turnover shaft about a second axis that is non-parallel with respect to said first axis of rotation; and

first means connecting the turnover shaft to the workpiece support means such that the workpiece support means is rotated about the second axis of rotation as the turnover shaft is being rotated about said first axis of rotation.

4,715,243

PLANETARY REDUCTION GEAR HAVING A MOLDED RING GEAR

Akira Morishita; Kyoithi Okamoto, both of Himeji; Toshihiko Gotoh, Ako; Yukio Kako, Himeji, and Takemi Arima, Kakogawa, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Aug. 30, 1985, Ser. No. 770,979

Claims priority, application Japan, Sep. 4, 1984, 59-134690[U]

Int. Cl.[4] F16H *55/17*

U.S. Cl. 74—434 **4 Claims**

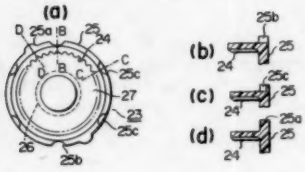
1. A planetary reduction gear comprising:

a sun gear;

a planet gear which meshes with said sun gear; and

an internally-toothed ring gear which surrounds said sun gear and said planet gear and meshes with said planet gear, said ring gear being formed of a molded synthetic resin and having a rim forced in its outer periphery and having a plurality of slots formed in said outer rim, said slots comprising through slots for bolts and non-piercing slots which extend only part way through the thickness of said rim, said slots being disposed at equal intervals around the

periphery of said rim to cause sink marks developing during molding of the resin to act uniformly on the ring



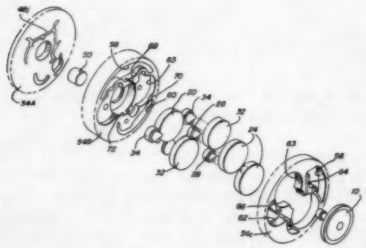
gear so that deformation of the ring gear during molding is prevented.

4,715,244

SELF-SCAVENGING GEAR BOX LUBRICATION SYSTEM

William A. Byrd, Rockford, and Anthony R. Smith, Roscoe, both of Ill., assignors to Sundstrand Corporation, Rockford, Ill.

Filed Jul. 17, 1986, Ser. No. 886,346
Int. Cl.[4] F01M *9/10*; F16H *57/04*
U.S. Cl. 74—467 **17 Claims**



1. A self-scavenging gear box lubrication system, comprising:

gear box housing means having at least one gear chamber therein providing close conformation with at least two meshing gears rotatably mounted in the chamber;

means for delivering lubricating fluid to the chamber;

at least one lubricating fluid collecting cavity in the housing means separate from, coplanar with and radially spaced from the gear chamber; and

passage means between the gears chamber and the collecting cavity and oriented generally coplanar with and tangentially of at least one of the meshing gears for passing fluid from the chamber to the cavity under the influence of centrifugal action effected by rotation of the gear teeth whereby the fluid can be scavenged from the cavity by appropriate lubrication pump means, said passage means being of restricted dimensions to provide a positive inlet pressure to prevent backflow from the collecting cavity into the gear chamber at all attitudes.

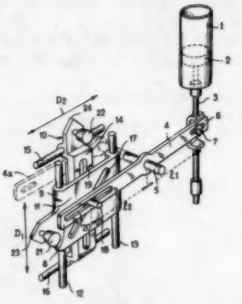
4,715,245

DEVICE FOR METERING A POWDERED, GRANULAR OR LIQUID PRODUCT, AND APPARATUS INCLUDING A DEVICE OF THE KIND

Joanny Daloz, 4 Rue Général Charbonel, 21120 Is Sur Tille, France

Filed Mar. 25, 1986, Ser. No. 843,662
Claims priority, application France, Apr. 3, 1985, 8505085
Int. Cl.[4] G05G *1/04*
U.S. Cl. 74—522 **2 Claims**

1. Device for metering a powdered, granular or liquid product, having a metering chamber (1) of variable volume, associated with means for changing the volume, the metering chamber (1) comprising a movable wall (2) within said chamber, said wall (2) being connected to an end of a lever (4), (26), (32) pivotally mounted about an axis (5), (27), (36), an end of the lever opposite the movable wall (2) being associated with first means (9), (25), (28), (33), (34) allowing the lever to be pivoted about said axis, and with second means (10), (27), (30), (31), (35) allowing the length of the lever (4), (26), (32) on one side of said pivotal axis (5), (27), (36) to be varied relative to the length of the lever on the other side of said axis, said first means (9) comprising a plate (11) mounted for sliding along a fixed straight line (D_1) which is transverse to the lever (4) and to said axis (5), said second means (10) comprising a plate (14) substantially parallel to the plate (11) of the first means and mounted



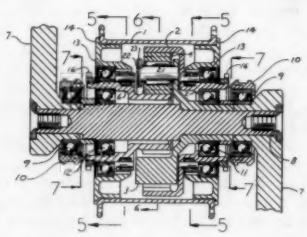
for sliding along a fixed straight line (D_2) substantially perpendicular to the straight line (D_1) of displacement of the first means, said plate (11) of the first means having an elongated opening (17) inclined with respect to the straight line (D_1) of displacement of said plate of the first means, a finger (18) mounted to slide in said elongated opening (17) and in an elongated opening (19) provided in the plate (14) of the second means, and extending substantially parallel to the straight line (D_1) of displacement of the plate (11) of the first means, said finger (18) being likewise engaged in an elongated opening (20) provided near said end (8) of the lever (4) opposite the metering chamber (1) and extending lengthwise along said lever, said pivotal axis (5) of the lever being fixed with respect to the lever.

4,715,246

THREE SPEED CHAINLESS PLANETARY TRANSMISSION FOR PEDAL-POWERED VEHICLES

Direk T. Hartmann, 4121 Morningstar Dr., Huntington Beach, Calif. 92649

Filed Apr. 4, 1986, Ser. No. 848,236
Int. Cl.[4] B62M *1/08*; F16H *3/44*
U.S. Cl. 74—594.2 **4 Claims**



1. In a pedal-powered vehicle including a rotatable pedal

drive shaft, a frame, and a driving wheel having a hub concentric with the axis of rotation of said drive shaft, an improved three speed, chainless transmission mounted within said hub and in concentric relation with the axis of rotation of said hub and comprising:

planetary gear carrier means fixedly mounted to said drive shaft for rotation therewith;

a plurality of externally toothed planetary gears rotatably carried by said carrier means and constrained against axial movement;

internally toothed ring gear means mounted in a fixed axial position on said drive shaft for concentric rotation about said drive shaft, and meshed with said planetary gears;

externally toothed sun gear means meshed with said planetary gears and supported in a fixed axial position on said drive shaft for concentric rotation about said drive shaft;

first free-wheel ratchet means coupled between said hub and said ring gear means for driving said hub, second free wheel ratchet means coupled between said hub and said sun gear means for driving said hub, said hub being driven by one of said ring gear means or said sun gear means or by both, or free wheeling independently of said ring gear means and said sun gear means, depending upon the direction and speed of rotation of said ring gear means and said sun gear means relative to said hub;

a pair of external locking means each being selectively and alternatively operable to lock one of said ring gear means or said sun gear means against rotation or to leave both free to rotate, said hub being driven by the unlocked one of said ring gear means or said sun gear means or by both;

said hub being driven at a selected rate of rotation depending upon whether the ring gear means or the sun gear means is free to rotate or both are free to rotate; and

an external shift means for selectively operating one of said ring gear locking means or said sun gear locking means.

4,715,247

TRANSMISSION APPARATUS WITH REDUCED FRICTIONAL FORCE

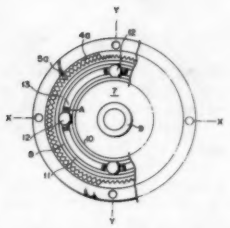
Toshio Honda; Toshiro Ohhashi, and Yasuo Ohtsubo, all of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki and Harmonic Drive Systems Inc., Tokyo, both of, Japan

Filed Sep. 25, 1986, Ser. No. 911,450

Claims priority, application Japan, Sep. 26, 1985, 60-211024; Sep. 26, 1985, 60-211025

Int. Cl.[4] F16H *33/00, 35/00, 37/00*

U.S. Cl. 74—640 **5 Claims**



1. A transmission apparatus comprising a circular spline, a flexspline, and a wave generator and having an elliptic cam having major and minor axes and an input shaft connected to said wave generator, and a wave generator bearing which is arranged around said cam and in which a plurality of balls are interposed between inner and outer races, wherein

said wave generator bearing comprises a ring-shaped retainer having a plurality of pockets for holding said balls which roll between said inner and outer races to be in contact with said inner and outer races and to be separated from each other in a circumferential direction;

each of said pockets of said retainer has a pocket inner surface forming a narrow opening portion at the inner race side and forming, at the outer race side, a wide opening portion having a larger size than said narrow opening portion at the inner race side; and

said pocket inner surface has a first contour line curved in a palne perpendicular to an axis of said wave generator, whereby

the balls at minor axis positons of said cam are in contact with the narrow opening portion of said pocket, and the surface of the balls at major axis positions of asid cam engage the pocket inner surface in an area containing a substantially central portion of said first contour line, said substantially central portion being substantially midway between said wide opening portion and said narrow opening portion.

4,715,248

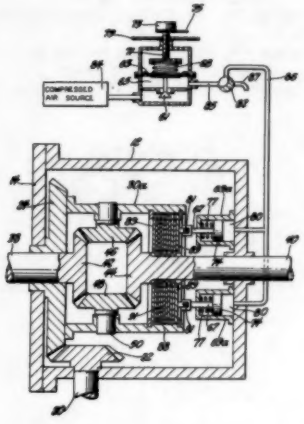
MANUAL DIFFERENTIAL LOCK-UP

Lawrence A. Gant, 628 University Pl., Grosse Pointe City, Mich. 48230

Filed Jul. 11, 1986, Ser. No. 884,829

Int. Cl.[4] F16H *1/44*

U.S. Cl. 74—710.5 **1 Claim**



1. In a wheeled vehicle having a drive shaft, left and right wheel-tire assemblies, left and right axles connected to respective ones of the wheel-tire assemblies for delivering motive power thereto, and differential arranged to transmit power from the drive shaft to the axles; said differential comprising a carrier, an input gear carried by the drive shaft for rotation within the carrier, output side gears carried by individual axles for independent rotation within the carrier, a ring gear driven by the input gear for rotation within the carrier, a differential case secured to the ring gear for rotation therewith, and differential gears rotatably mounted on the differential case in meshed engagement with the output gears, whereby power is delivered to the output side gears from the case through the differential gears:

the improvement comprising releasable means for adjustably locking one of the side gears to the differential case or unlocking said one side gear for free rotation relative to the differential case; said releasable locking means comprising a first series of clutch plates keyed to the differential case, and a second series of clutch plates keyed to the axle associated with said one side gear; the first and second clutch plates being interspersed so that adjacent plates can be frictionally engaged to form a driving connection from the differential case to said one side gear; a plural number of air cylinder units mounted on the carrier; each air

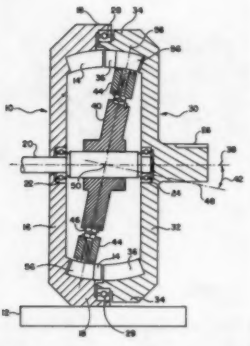
cylinder unit comprising a piston, a piston rod, and a roller on the piston rod; said air cylinder units being arranged so that the rollers have pressure contact with an end one of the clutch plates to transmit an operating force thereto; an air pressure source; manually-operable valve means enabling pressurized air to flow from the source to the air cylinder units, or to flow from the air cylinder units to atmosphere; and a manually adjustable air pressure regulating means for varying the pressure of the air flowing from the source to the valve means, whereby the frictional forces existing between the clutch plates are varied to vary the amount of slippage between the plates when the air cylinder units are pressurized.

4,715,249

SPEED CHANGE DEVICE

Edward C. Tibbals, Jr., 2216 Guilford College Rd., Jamestown, N.C. 27282

Filed Aug. 28, 1986, Ser. No. 901,183
Int. Cl.[4] F16H *1/28, 13/06*
U.S. Cl. 74—800 **17 Claims**



1. In speed change assembly,

a rotatable drive shaft having a longitudinal axis,

swash plate means disposed at a predetermined angle of inclination with respect to the longitudinal axis of said drive shaft and rotatable in conjunction therewith,

an independently rotatable annular ring member journaled on the periphery of said swash plate means and having its axis of rotation intersecting the longitudinal axis of said drive shaft at a center of rotation,

a plurality of equally spaced freely rotatable frusto-conical rollers mounted on the periphery of said annular ring member, said frusto-conical rollers having their axes of rotation intersecting said center of rotation and the extension apex of their exterior surfaces coincident with said center of rotation,

fixed race means positioned to be engaged by the rollers on the periphery of said ring member having a race pattern including a predetermined number of equally spaced extending crests separated by selectively shaped recesses therebetween,

said number of crests either equalling the number of rollers or differing from the number of rollers by one.

4,715,250

ROTARY CUTTING CYLINDER AND METHOD OF MAKING SAME

Thomas J. Rosemann, 993 Barbizon, Manchester, Mo. 63021

Filed Jun. 27, 1986, Ser. No. 879,617
Int. Cl.[4] B21K *5/12;* **B26D** *1/62*
U.S. Cl. 76—101 A **22 Claims**

1. A method of making a rotary cutting cylinder comprising the steps of:

forming a generally cylindrical section having a plurality of longitudinally spaced grooves, with at least a portion of each longitudinally spaced groove being generally tangential to the cylindrical section;

making a longitudinal slot in the cylindrical section crossing the grooves, the slot having opposing sidewalls;

inserting a cutting rule in the slot;

inserting a mounting bar in the slot, the mounting bar having a plurality of longitudinally spaced set screws therein, and aligning the set screws with the grooves in the cylindrical section;

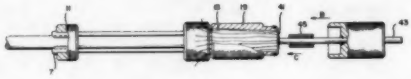
tightening the set screws to urge the cutting rule against one sidewall of the slot and for urging the mounting bar away from the cutting rule and against the opposite sidewall of the slot to secure the cutting rule and the mounting bar in the slot.

4,715,251

FIBER OPTIC CABLE PREPARATION TOOL AND METHOD OF PREPARING FIBER OPTIC CABLE FOR TERMINATION WITH A FIBER OPTIC CONNECTOR

Mark Margolin; Igor Grois, both of Lincolnwood, and James E. Moore, Wheaton, all of Ill., assignors to Amphenol Corporation, Wallingford, Conn.

Filed Aug. 4, 1986, Ser. No. 892,986
Int. Cl.[4] H02G *1/12*
U.S. Cl. 81—9.4 **7 Claims**



1. A tool for preparing a fiber optic cable for termination with a fiber optic connector, the fiber optic cable being of the type having. in a concentric arrangement, from the exterior to the center thereof, an outer protective cover, a layer of strength members and a buffer layer covered fiber, the tool comprising:

an elongate first member having a longitudinal passage extending therethrough, said member having one end of clampable construction and another end whose exterior surface is of frusto-conical shape, and further comprising clamp means for clamping said one end onto a fiber optical cable to be received within said longitudinal passage and held by said first member;

second clamp member having a longitudinal passage therethrough of a size such that said second clamp member can be received on the exterior of said other end of said first member in a manner for holding strength members of a fiber optic cable securely against the outer surface of said other end; and

sleeve press means having a longitudinal passage extending therethrough of a size sufficient to permit a buffer covered

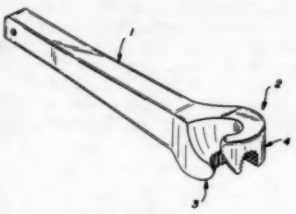
fiber of a fiber optic cable to pass therethrough, and a recess at one end of predetermined depth for receiving an inner crimp sleeve, which is mountable surrounding said buffer covered optical fiber, in a abutment against the one end of said sleeve press means a manner such that said inner crimp sleeve can be forced into said cable between said strength layer and said buffer layer to provide a support to an outer crimp sleeve of a connector with which the fiber optical cable is to be terminated.

4,715,252

VALVE WRENCH

Amy Pella, Pascagoula, Miss., assignor to Chevron Research Co., San Francisco, Calif.

Filed Jul. 15, 1986, Ser. No. 885,900
Int. Cl.[4] B25B *13/48*
U.S. Cl. 81—176.1 **4 Claims**



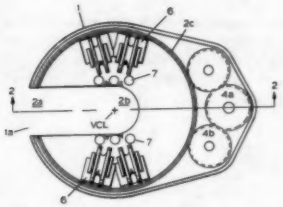
1. A valve wrench comprising:
(a) a handle;
(b) a wheel grasping device comprising:
(i) a rim grip at the end of said handle extending from said handle at a radius of curvature which approximates the radius of curvature of a rim of a valve wheel; and
(ii) a spoke grip adjacent to said rim grip, said spoke grip extending in a direction opposite said rim grip, then extending at a radius of curvature greater than that of said rim, then extending at a radius of curvature which approximates the radius of curvature of a valve wheel spoke whereby the load applied to said valve wheel is distributed to both the spoke and rim.

4,715,253

LINE WRAP POWER TONGS

Thomas E. Falgout, Sr., and William N. Schoeffler, both of Lafayette, La., assignors to Team Engineering and Manufacturing, Inc., Youngsville, La.

Filed Mar. 11, 1986, Ser. No. 838,459
Int. Cl.[4] B25B *17/00*
U.S. Cl. 81—57.14 **26 Claims**



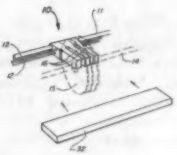
1. An open throat power tong assembly for rotating pipe to make up or break apart a threaded connection, comprising:
(a) a tong body having a generally central opening therethrough, and a pipe-receiving throat opening at one side of the body into said central opening;
(b) a partial drive ring rotatably mounted on said body and defining an opening at one side thereof adapted for alignment with said throat in one rotational position;
(c) a partial reel carrier ring rotatably mounted on said body and defining an opening at one side thereof adapted for alignment with said throat in one rotational position;
(d) a plurality of spring biased rewind reels mounted on said partial reel carrier ring distributed about the rotational axis, situated such that flexible elements stored on said reels may be pulled from said reels in the general direction of said generally central opening, when pulling force on said flexible element exceeds a preselected amount, said reels capable of recovering said flexible element when said pulling force is reduced below said preselected amount;
(e) first driving means mounted on said body and drivingly engaging said partial drive ring in rotation about said throat;
(f) second driving means mounted on said body and drivingly engaging said partial reel carrier ring for independent rotation relative to said partial reel carrier about said throat; and
(g) a plurality of elongated flexible elements, each having a driven end and a tailed end, said tailed end capable of retraction into one of said reels, said driven and attached to said driven ring such that relative rotation of said two partial rings will wrap said line around the periphery of pipe situated in said opening.

4,715,254

SAW GUIDE WITH COOLING AND LUBRICATING CAPABILITY

Allen D. DeGan, 655 Hilltop Dr. #69, Redding, Calif. 96003

Filed Jan. 14, 1987, Ser. No. 3,061
Int. Cl.[4] B27B *5/29*
U.S. Cl. 83—169 **7 Claims**



1. A saw guide for use with saw blades, comprising:
a guide block having:
a first hole therein;
a second hole therein;
mixing means for mixing substance in said first hole with substance in said second hole;
a third hole communicating with said first hole and said mixing means whereby substance in said first hole is routed to said mixing means;
a fourth hole communicating with said second hole and said mixing means whereby said substance in said second hole is routed to said mixing means, and
orifice means communicating with said mixing means and positioned and oriented to deposit substances previously mixed by said mixing means on a saw blade,
thereby lubricating and cooling said saw blade.

4,715,255

SAW CARRIAGE STABILIZER

Ronald W. Harriman, P.O. Box 258, Troutdale, Oreg. 97060

Filed Oct. 24, 1985, Ser. No. 791,166
Int. Cl.[4] B27B *7/02*
U.S. Cl. 83—471.2 **2 Claims**

1. A portable saw mill comprising:
an elongated supporting frame,

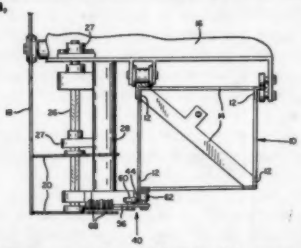
a carriage movable longitudinally on said frame and having a vertical saw blade at one side thereof,

a depending support on said carriage supporting at least one horizontal saw blade cooperating with the vertical saw blade in sawing boards from a log,

a longitudinal depending guide flange secured to the elongated supporting frame,

a laterally extending bracket secured to a lower portion of the said depending support,

a slide plate slidably mounted on said bracket in a lateral direction,



a pair of rollers mounted on said slide plate engageable on opposite sides of said flange and having guided following movement along said longitudinal guide flange for stabilizing the lower portion of said depending support and the horizontal saw blade thereon in a lateral direction,

abutment means on at least one of said bracket and slide plate,

and compression spring means on both sides of said abutment means engageable with at least one of said bracket and slide plate and providing resilient adjustment of at least one of said bracket and slide plate to adjust to lateral irregularities in said flange.

4,715,256

FUEL ELEMENT SHEARS HAVING A STEPPED BLADE

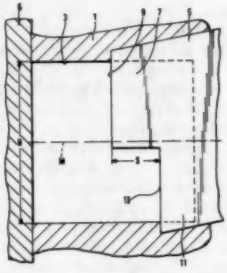
Peter Kunze, Leimersheim, and Werner Kirsch, Bruchsal-Bückenau, both of Fed. Rep. of Germany, assignors to Wiederaufarbeitungsanlage Karlsruhe Betriebsgesellschaft mbH, Eggenstein-Leipoldshafen, Fed. Rep. of Germany

Filed Nov. 10, 1986, Ser. No. 929,403

Claims priority, application Fed. Rep. of Germany, Nov. 19, 1985, 3541000

Int. Cl.[4] G21C *19/36*; B26D *1/00*

U.S. Cl. 83—694 **2 Claims**



1. A fuel element shearing apparatus for shearing a fuel element having a plurality of fuel rods having a predetermined precompacted width and defining a longitudinal axis, the shearing apparatus comprising:

a horizontal magazine adapted for receiving an undismantled nuclear reactor fuel element to be sheared and having a magazine opening through which the fuel element is incrementally pushed during the shearing operation;

a stepped blade having only two shearing edges and being movably mounted in front of said opening for movement thereacross in a direction perpendicular to said longitudinal axis for shearing first and second portions of said fuel element, respectively;

one of said shearing edges being an upper shearing edge and the other one of said shearing edges being a lower shearing edge, said lower shearing edge being disposed rearwardly of said upper shearing edge so as to cause said lower shearing edge to be disposed a step distance away from said upper shearing edge;

said step distance being adapted to correspond to at least said width of the precompacted fuel element so as to cause said upper shearing edge and said lower shearing edge to shear said first and second portions sequentially; and,

said upper shearing edge having a length longer than the length of said lower shearing edge.

4,715,257

WAVEFORM GENERATING DEVICE FOR ELECTRONIC MUSICAL INSTRUMENTS

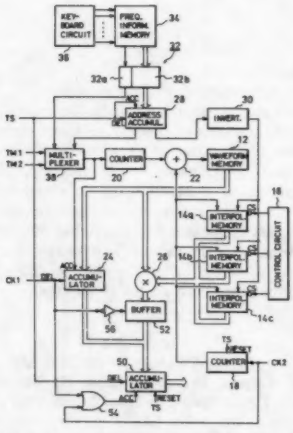
Atsushi Hoshiai, and Hiroyuki Endo, both of Osaka, Japan, assignors to Roland Corp., Osaka, Japan

Filed Jul. 25, 1986, Ser. No. 889,472

Claims priority, application Japan, Nov. 14, 1985, 60-256142

Int. Cl.[4] G10H *7/00*

U.S. Cl. 84—1.01 **2 Claims**



1. A waveform generating device for electronic musical equipment, comprising:

means for generating addresses consisting of an integral part and a fractional part each;

waveform memory means for storing differences between adjoining samples of amplitude form a waveform for subsequent generation thereof;

interpolation memory means for storing coefficients g_{i+mj} which are given by an equation

$$g_{i+mj} = \sum_{k=j}^{n-1} f_{i+mk}$$

where i=0, 1, 2, . . . m−1, and j=1, 2, . . . n−1, and where f_{i+mk} denotes specific ones of a series of amplitude values f_L(L=0, 1, 2, . . . mn−1) sampled from an impulse response characteristic of a low-pass interpolation filter at a frequency equal to "m" times a sampling frequency of said waveform, and "n" denotes the number of interpolation points;

means for effecting a convolution operation using said differences read out in correspondence to the integral parts of

said addresses and said coefficients read out in correspondence to the fractional parts of said adresses;

means for accumulating said differences in the waveform; and

means for summing a value resulting from said accumulating and a resultant of said convolution operation to obtain the amplitude of said waveform.

4,715,258

POWER TRANSMISSION FOR USE IN AUTOMOBILES HAVING CONTINUOUSLY VARIABLE TRANSMISSION

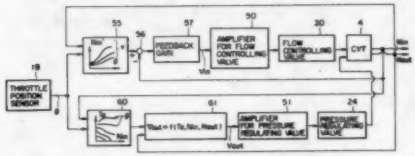
Takashi Shigematsu; Tomoyuki Watanabe; Setsuo Tokoro, all of Susono, and Daisaku Sawada, Gotenba, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed Jan. 6, 1984, Ser. No. 568,810

Claims priority, application Japan, Aug. 29, 1983, 58-156464

Int. Cl.⁴ B60K *41/14*

U.S. Cl. 74—866 **12 Claims**



12. A power apparatus for vehicles in which power of an internal combustion engine is transmitted to drive wheels through a belt system continuously variable transmission, comprising:

a throttle valve of an intake system of said engine;

means for detecting the position of said throttle valve;

an accelerator pedal of said engine, said accelerator pedal being connected to said throttle valve so that the engine output horsepower requirement is a function of the position of the accelerator pedal;

memory means defining a desired engine speed as a function of throttle position and vehicle speed over the operational speed range of the engine, wherein a given throttle position and vehicle speed uniquely define a desired engine speed which will operate the engine at said horsepower requirement with minimum specific fuel consumption;

means for causing said engine to achieve said desired engine speed, comprising means for calculating a difference between actual engine speed and said desired engine speed and feedback control means controlling said continuously variable transmission on the basis of said calculated difference until said desired engine speed is achieved;

means for calculating an engine output torque as a function of said intake system throttle position and engine speed from an intake system throttle position and the actual engine speed; and

means for controlling belt pressing pressure on output side disks of the belt system continuously variable transmission as a function of calculated engine output torque and an approximation of an output disk side belt engaging radius of the belt system continuously variable transmission.

4,715,259

STRAP MOUNTING ASSEMBLY FOR ELECTRIC GUITARS PERMITTING MULTIPLE GUITAR ROTATIONS

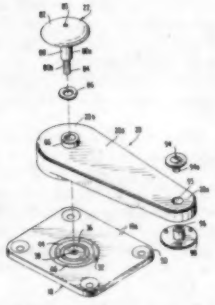
Kenneth L. Wittman, 416 Vine St., Montoursville, Pa. 17754

Filed Apr. 6, 1987, Ser. No. 34,446

Int. Cl.⁴ G10G *5/00*

U.S. Cl. 84—327 **7 Claims**

1. A strap mounting assembly for mounting opposite ends of a strap borne by a performer to the rear face of an electrical string musical instrument body at a balance point thereof to permit the instrument body to be rotated about the axis of the balance point while maintaining electrical connections to said instrument body, said assembly comprising: a flat metal base plate having a tapped hole therein for placement coincident with said balance point and being screw mountable to said rear face, said flat base plate including a bottom surface mountable on the top surface of the rear face of said musical instrument body, and a top surface on the opposite side thereof, ring connector mounted to said base plate on said top surface and being electrically insulated from said base plate and having an integral "hot" terminal extending through said base plate and electrically insulated therefrom, an elongated arm formed of molded electrically insulative material having a longitudinal center line and having opposite inboard and outboard ends, a first hole within said inboard end of said arm at right angles to the longitudinal center line and intersecting said center line, a retainer button having a headed end and a threaded shank, said threaded shank projectable through one end of said strap and through said first hole within said inboard end of said arm and being threaded into said base plate tapped hole, said molded electrically insulative material arm having molded therein, radially spaced contacts about said first hole, an electrically shielded cable molded into said arm and having a shield element concentrically surrounding a core conductor and being electrically insulated therefrom, said shield element and said

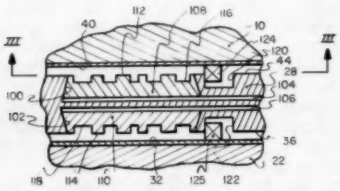


core conductor being electrically connected respectively to said molded, radially spaced contacts and wherein said radially spaced contacts are positioned with respect to said first hole such that portions project outwardly of the bottom surface of said arm and in contact respectively with said ring connector and the face of said metal base plate proximate to said arm whereby electrical circuits are completed between the shield element and conductor core of the shield cable molded into the arm and the metal base plate and ring connector respectively on the instrument body via respective radially spaced contacts to facilitate the connection between the base plate and ring connector and an electrical output jack, a screw projecting through a second hole within the outboard end of said elongated arm, said assembly further comprises a retainer disk having a tapped hole within the center thereof, and wherein, the end of the screw passing through said second hole and through the other end of said strap is threaded into said retainer disk and wherein, said strap is of the length between the ends thereof coupled to respective ends of said arm such that, the guitar may be rapidly rotated through multiple rotations about a point defined by the retainer button with the instrument positioned comfortably at the waist of the performer, while maintaining the electrical connection between a pickup and the shielded cable.

4,715,260
SEAL

Paul B. Pribis, Saratoga, N.Y., and Herbert J. West, Pittsfield, Mass., assignors to General Electric Company, Pittsfield, Mass.

Filed Dec. 22, 1986, Ser. No. 945,152
Int. Cl.[4] F41F *1/04*
U.S. Cl. 89—7 **2 Claims**



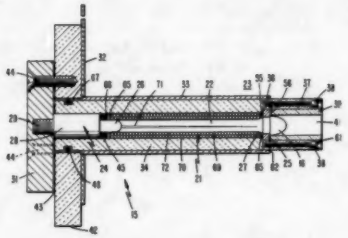
1. A sealing mechanism for a pump comprising:
a housing having a cavity with an inner wall;
a central journal disposed in said housing cavity;
a piston having a piston head and a skirt defining a central cavity, said skirt having its distal region disposed on said central journal with one end of said journal projecting into said piston central cavity to define a pumping chamber between said projecting one end of said journal and said piston head and a clearance gap between said skirt and said housing cavity inner wall; and
a sealing mechanism for sealing said clearance gap;
characterized in that
said sealing mechanism comprises:
an additional pumping chamber defined by said housing cavity inner wall, said journal and the distal end face of said skirt;
a porous annular body disposed into the annular exterior surface of said skirt adjacent said housing cavity inner wall;
a plurality of annular grooves disposed in said body, each groove opening towards said housing cavity inner wall;
a passageway through said skirt coupling said porous body with said skirt distal end face; and
means for providing liquid into said additional pumping chamber; and
having a mode of operation wherein liquid flows from said additional pumping chamber through said passageway, through said porous body, through said annular grooves and into said clearance gap.

4,715,261
CARTRIDGE CONTAINING PLASMA SOURCE FOR ACCELERATING A PROJECTILE

Yeshayahu S. A. Goldstein, Gaithersburg; Derek A. Tidman, Silver Spring, both of Md.; Rodney L. Burton, Springfield; Dennis W. Massey, Manassas, and Niels K. Winsor, Alexandria, all of Va., assignors to GT-Devices, Alexandria, Va.

Filed Oct. 5, 1984, Ser. No. 657,888
Int. Cl.[4] F41F *1/00*
U.S. Cl. 89—8 **43 Claims**

1. A cartridge for accelerating a projectile through a bore and muzzle of a gun, the bore being in a barrel of the gun, the gun having a breech having a bore aligned with the barrel bore, the cartridge having a geometry enabling it to be loaded into the breech bore through an end of the breech bore and comprising means for supplying a plasma jet behind a projectile in the barrel bore, the plasma jet supplying means including: a first tube having an interior wall surface forming a capillary passage, the first tube comprising a mass of a dielectric substance confined between the interior wall surface and an exterior wall surface of the tube, a second dielectric tube having an inner wall surface abutting against and confining the exterior wall surface, a metal sleeve having an inside wall surface abutting against and confining an exterior wall surface of the second tube and an outside wall surface adapted to abut against and be confined by the breech bore, first and second electrodes located at opposite ends of the first tube for applying a discharge voltage between spaced region along the iength of the interior wall surface while the dielectric ionizable substance is between the regions, the dielectric substance including at least one element that is ionized to form a plasma in response to the discharge voltage being applied between the spaced regions, the diametric length across the passage being short relative to the distance between the spasced regions, first and second ends of the passsage being respectively open and

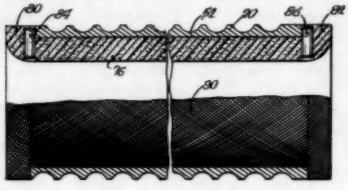


blocked to respectively enable and prevent the flow of plasma th rough them, the block ends closed the breech bore, the plasma forming an electric discharge channel between the spaced regions, ohmic dissipation occurring in the electric discharge channel to produce a pressure in the passage to cause the plasma in the passage to flow longitudinally in the passage and through the first end to form the plasma jet having sufficient pressure to accelerate the projectile from the vicinity of the breech through the barrel and muzzle, and means for establishing electric connections from a source of the discharge voltage to the first and second electrodes through the breech bore end, the electric connection to the second electrode being established via the metal sleeve.

4,715,262
BALLISTIC TOLERANT DUAL LOAD PATH BALLSCREW AND BALLSCREW ACTUATOR

Jeffrey D. Nelson, Rockford, and John F. Scanlon, Roscoe, both of Ill., assignors to Sundstrand Corporation, Rockford, Ill.

Continuation-in-part of Ser. No. 686,983, Dec. 27, 1984. This application Dec. 6, 1985, Ser. No. 805,627
Int. Cl.[4] F41H *5/00*; F16H *1/20*; B64D *7/00*
U.S. Cl. 89—36.02 **15 Claims**



1. A ballistic tolerant dual load path ballscrew actuator having an outer tubular member of metal subject to cracking when hit by a projectile and having an external helical groove for coaction with a ballnut and a second tubular member positioned within and having a length generally coextensive with said outer tubular member, said members being secured to each other adjacent their ends whereby the second member may react to loads applied to the ballscrew in the event the outer tubular member fails, the improvement wherein said second tubular member is formed of a rigid ballistic tolerant nonmetallic material which maintains its structural integrity without

cracking thereof when hit by a projectile whereby the second tubular member will provide a secondary load path after the outer tubular member has cracked and prevent lengthwise elongation of the outer tubular member and avoid increase in the size of the crack in the outer tubular member which could cause the ballnut to malfunction, and said second tubular member having a surrounding shell of ceramic material bonded thereto.

4,715,263

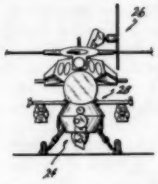
ROLL TURRET FOR A GUN MOUNT

S. Bertram Kramer, Santa Monica, Calif., and Evan P. Sampatacos, Mesa, Ariz., assignors to McDonnell Douglas Helicopter Co., Mesa, Ariz.

Filed Dec. 30, 1985, Ser. No. 814,886

Int. Cl.[4] B64D *7/06*

U.S. Cl. 89—37.21 **5 Claims**



1. An apparatus for mounting a gun in an aircraft comprising:

a gun;

a turret rotationally coupled to and disposed within said aircraft, said turret defining a turret axis, said gun being rotationally coupled to said turret about an elevation pivot axis, said gun rotating with said turret about said turret axis and said gun being selectively rotatable about said elevational pivot axis, said elevational pivot axis being approximately orthogonal to said turret axis, said gun and turret being arranged and configured about said elevation pivot axis and turret axis to assume a retracted orientation of said gun and turret within said aircraft, an orientation of said gun and turret about said elevation pivot and turret axis other than said retracted orientation disposing said gun outside of said aircraft for firing; and

means for enclosing said gun and turret within said aircraft when in said retracted orientation,

wherein said means for enclosing comprises at least a pair of doors, each door coacting with said turret by contact between said turret and each door to selectively expose said gun and turret outside said aircraft and to selectively enclose said gun and turret within said aircraft,

whereby positioning of said gun within and outside of said aircraft as well as aiming with said gun in an arbitrary direction is effectuated by selective rotation of said gun and turret only about said turret axis and said elevation pivot axis.

4,715,264

PISTON AND CYLINDER UNIT

Kurt Stoll, Lenzhalde 72, 7300 Esslingen, Fed. Rep. of Germany

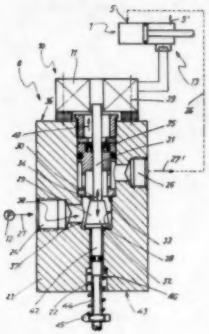
Filed Feb. 20, 1986, Ser. No. 832,475

Claims priority, application Fed. Rep. of Germany, Feb. 22, 1985, 3506180

Int. Cl.[4] F01B *25/02*; F15B *13/04*

U.S. Cl. 91—16 **9 Claims**

1. A piston and cylinder unit comprising a cylinder, a piston sliding in the cylinder, a piston rod attached to the piston, a regulating valve connected to said cylinder for controlling speed of motion of said piston in said cylinder, said regulating valve defining an open position to allow free passage therethrough of fluid for driving said unit and a choking position to choke the passage of fluid to said unit for the purpose of slowing down piston motion, at least one sensor designed to respond to a given position of said piston and to change the setting of said regulating valve following such response, said sensor being a contactless sensor and an electrically operated setting unit for operation of said regulating valve in response to a signal from said sensor for changing over said regulating



valve between its open and choked positions, said regulating valve comprising a housing defining a first fluid duct for conducting fluid to said cylinder, said regulating valve further comprising a valve plug capable of extending into said duct to a greater or lesser extent for choking fluid flow to said cylinder, and externally accessible means for adjusting such depth of extension into said duct.

4,715,265

PROCESS AND APPARATUS FOR VIBRATORY OPERATION OF A WORKING PISTON, IN PARTICULAR FOR ACTIVE WORKING TOOLS

Achim Graul, Wittelsbacherstrasse 42, 8070 Ingolstadt, and Elmar Niedermeier, Neuburg/Do.-Ried, both of Fed. Rep. of Germany, assignors to Achim Graul, Ingolstadt, Fed. Rep. of Germany

PCT No. PCT/EP84/00227, § 371 Date Mar. 22, 1985, § 102(e) Date Mar. 22, 1985, PCT Pub. No. WO85/00762, PCT Pub. Date Feb. 28, 1985

PCT Filed Jul. 21, 1984, Ser. No. 717,230

Claims priority, application Fed. Rep. of Germany, Aug. 6, 1983, 3328426

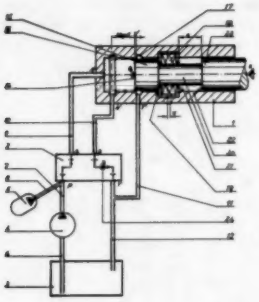
Int. Cl.[4] F01B *1/00*; F16D *31/02*

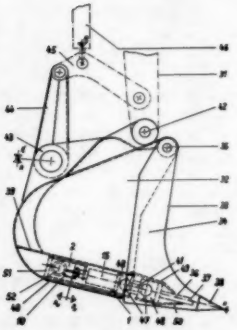
U.S. Cl. 91—170 R **15 Claims**

1. In a process for vibratory operation of a working piston (15) for hydraulic tools and the like, which is displaceable with a reciprocating motion over a given working stroke movement in a cylinder (1), with a control device which allows pressure fluid into and out of the cylinder in rapid succession, the improvement characterised in that only one side of the working piston (15) is acted upon by pressure fluid and that the return movement of the piston is effected by reaction forces on the tool, wherein in the absence of reaction forces or when the maximum working stroke movement of the piston is reached pressure fluid is discharged from the cylinder (1), by-passing the control device (2).

3. In apparatus for producing a vibratory movement at a working piston (15) which is displaceable in a cylinder (1), with a pulse-generating control device (2) which lets pressure fluid into and out of the cylinder in rapid succession, the improvement characterised in that a feed conduit (9) leads from the control device (2) to the cylinder (1) for pressure fluid actuation of the piston (15) on only one side thereof, that a return conduit (10) leads from the cylinder to the control device (2), from the same side of the piston, wherein said conduits (9, 10) can be alternatingly opened and closed by the control device (2), and that arranged on the cylinder (1) is a

relief opening (17) which is exposed when the maximum piston stroke movement is reached and by way of which pressure





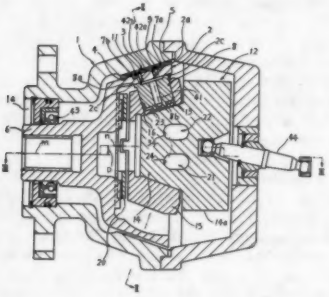
fluid can be drained from the cylinder (1) independently of the control position of the control device.

4,715,266

ROTARY FLUID ENERGY CONVERTER

Yasuo Kita, Kyoto, Japan, assignor to Shimadzu Corporation, Kyoto, Japan

Filed Oct. 21, 1986, Ser. No. 921,079
Int. Cl.[4] F01B *13/04, 13/06*
U.S. Cl. 91—488 **2 Claims**



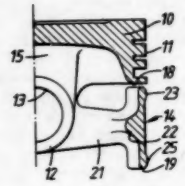
1. A rotary fluid energy converter comprising:
a housing having a tapering surface in its inner surface;
a torque ring closely held against the tapering surface of the housing via first static pressure bearings that are circumferentially spaced from one another, the ring having flat inner surfaces corresponding to the first bearings;
pistons disposed on the inner side of the torque ring and having their front ends attached to the flat inner surfaces of the ring via second static pressure bearings;
a cylinder barrel for slidably holding the base ends of the pistons;
a pintle which is disposed in an eccentric relation to the axis of the housing and which rotatably holds the cylinder barrel;
spaces formed between each piston and the cylinder barrel, the volumes of the spaces being increased or decreased as the torque ring is rotated relative to the housing;
two fluid communication lines which communicate with the spaces whose volumes are increasing and decreasing, respectively;
fluid passages for directing fluid from the spaces to the first and second static pressure bearings, whereby the static pressure of the fluid introduced in the first static pressure bearings and the static pressure of the fluid introduced in the second static pressure bearings produced coupled forces about the axis of rotation of the torque ring;
at least one pair of axially adjacent pressure pockets formed in each of the first static pressure bearings; and
restrictors through which fluid flowing out of the spaces is distributed to the corresponding pressure pockets, and wherein the pressurization of the pressure pockets of said first static pressure bearings is effected by sliding surfaces between the flat inner surfaces of the torque ring and the flat surfaces of the pistons.

4,715,267

BEARING SURFACE FOR INTERNAL COMBUSTION ENGINE PISTON SKIRT

John W. Richmond, Rugby, England, assignor to AE PLC, Warwickshire, England

Filed Dec. 17, 1985, Ser. No. 809,712
Claims priority, application United Kingdom, Dec. 19, 1984, 8432015
Int. Cl.[4] F16J *1/02, 1/04, 1/16*
U.S. Cl. 92—232 **7 Claims**



1. A piston for an internal combustion engine or a compressor comprising:
a crown,
a ring band,
two gudgeon pin bosses defining a gudgeon pin bore,
two arcuate skirt members on opposite sides of the gudgeon pin bore and spaced from the ring band,
two pairs of struts, each pair extending from respective gudgeon pin bosses and supporting an associated skirt member,
a central portion of increased radial thickness included in each skirt member and extending circumferentially around each skirt member between points of connection of the associated struts with the skirt member,
a circumferentially extending bearing surface included in each skirt member for transmitting lateral loads and guiding the piston during reciprocation, the bearing surface being axially spaced from said central portion of incresed radial thickness, a flexible flange included in each skirt

member and connected between the associated bearing surface and the central portion of increased radial thickness the flexible flange being continuous around the circumferential extent of the associated bearing surface so that the flexible flange allows flexure of the associated bearing surface relative to the associated central portion under lateral loads, to reduce piston noise.

4,715,268

VENTILATOR DEVICE

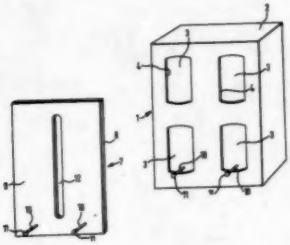
Robert A. Tanner, Pampisford, England, assignor to Dixon International Limited, England

Continuation of Ser. No. 617,883, Jun. 6, 1984, abandoned. This application Jan. 10, 1986, Ser. No. 817,802

Claims priority, application United Kingdom, Jun. 7, 1983, 8315653

Int. Cl.[4] F24F *7/00*; G05D *23/13*

U.S. Cl. 98—41.1 **9 Claims**



1. A ventilator device comprising a casing, said casing including a wall having one or more openings formed therein for passage of ventilation air therethrough, a shutter pivotably mounted within the casing for pivotal movement about a fixed axis between an open position and a closed position, the axis about which said shutter pivots being located such that in said closed position a surface of said shutter is closely juxtaposed to a mating surface of said wall, effectively blocking passage of air through said openings in said wall, and such that in said open position said shutter is substantially displaced from said wall, allowing passage of air through said openings in said wall, said shutter being normally held in said open position, first spring means for urging the shutter to said closed position to close the one or more openings, and second solenoid means actuation of which releases the shutter to cause it to be moved by said first means from the open position to the closed position to close said one or more openings, at least one aperture being formed in said shutter, said at least one aperture being located such that each said aperture is out of registration with the one or more openings in said wall when said shutter is moved to the closed position to close said one or more openings in said casing, and wherein each said aperture is out of registration with said one or more openings in said wall when said shutter is in the open position, such that air flow through said openings in said wall and said aperture in said casing follows a generally serpentine path.

4,715,269

COFFEE MAKER WITH PLASTIC DECANTER AND LOW TEMPERATURE WARMING PLATE

Arthur L. Stoner, Signal Hill, Calif., assignor to Wilbur Curtis Company, Inc., Los Angeles, Calif.

Filed Dec. 29, 1986, Ser. No. 946,862

Int. Cl.[4] A47J *31/00*

U.S. Cl. 99—279 **23 Claims**

1. A coffee maker comprising:

a brewing and dispensing unit for brewing and discharging coffee;

a decanter constructed of heat resistant thermal insulative plastic for receiving coffee discharged from said brewing and dispensing unit and formed with a bottom portion of a predetermined configuration;

a warming table for receiving the decanter and maintaining the brewed coffee warm therein;

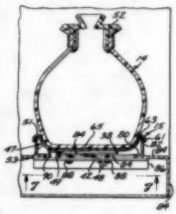
a heat conductive warming plate mounted on said table and formed with a dished out well having a bottom wall and raised a peripheral wall with peripheral walls configured to complementally receive said bottom portion of said predetermined configuration to enhance heat conduction thereto, and;

a heating element in thermal communication with said well whereby said decanter may be positioned with said bottom portion nested in said well in direct contact with said peripheral wall for direct heat conduction from said well to said bottom portion.

13. A coffee maker for use at room temperature of about 68° F. to brew coffee and maintain it at a warm temperature and comprising:

a brewing and dispensing unit for brewing and discharging the brewed coffee;

a decanter formed with thermally insulative plastic walls



defining a chamber for receipt of a predetermined volume of brewed coffee discharged from said brewing and dispensing unit and being formed with an open top and a bottom portion having a predetermined configuration, said decanter including a lid to cover said open top, said walls and lid providing sufficient thermal insulation to, when said cavity is substantially filled with said predetermined volume of coffee at substantially 180° F. at room temperature of about 68° F., limit the heat transfer from said coffee to a predetermined rate;

a warming plate for receiving said decanter and formed with a thermally conductive well configured to receive said bottom portion in close fitting heat exchange relationship, said warming unit including a heating element operative to maintain a selected temperature of about 200° F., said heating plate being constructed of a heat conductive material having a sufficiently high heat transfer coefficient to cooperate with said heating element, well, and decanter to form a heat path from said heating element into said decanter, having a sufficiently low resistance to heat transfer to, when said heating plate is at said 200° F., transfer said heat to said brewed coffee at said predetermined rate.

4,715,270

BEVERAGE BREWING APPARATUS FOR VENDING MACHINES

Tsutomu Harada, Takasaki, Japan, assignor to Sanden Corporation, Gunma, Japan

Filed Dec. 18, 1985, Ser. No. 810,171

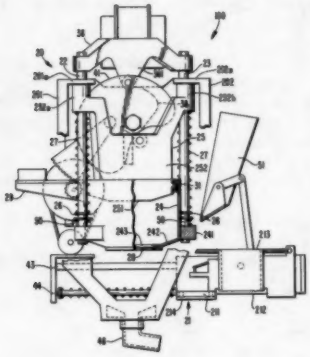
Claims priority, application Japan, Dec. 28, 1984, 59-196715[U]

Int. Cl.[4] A47J *31/00*

U.S. Cl. 99—289 R **2 Claims**

1. In a beverage brewing apparatus comprising a frame, a vertically movable cylinder member supported on said frame, said cylinder member having an open top and open bottom, a vertically movable piston member disposed in said cylinder

and supported by said frame, means for supplying hot water into said cylinder below the elevation of said piston, a base assembly including a brewing cavity disposed beneath said cylinder member, said brewing cavity being mounted to be movable horizontally between a brewing position and a discharge position and be sealed with said cylinder member in



said brewing position, a motor driven cam shaft, a plurality of cams on said cam shaft and cam followers to determine the movement of said cylinder and said piston, the improvement comprising biasing means disposed between said frame and said cylinder to normally push said cylinder downwardly to insure sealing between said cylinder and said brewing cavity when said brewing cavity is disposed at the brewing position.

4,715,271

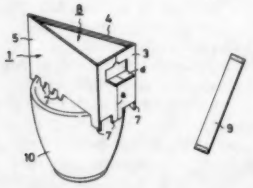
DISPOSABLE BEVERAGE BREWER

Keisuke Kitagawa, Chofu, Japan, assignor to Noazi Kasai, Japan

Filed Jul. 31, 1986, Ser. No. 890,934

Int. Cl.[4] A47J *31/02, 31/06*

U.S. Cl. 99—306 **6 Claims**



1. A filter brewer of triangular configuration comprising three planar side member defining an upper and a lower opening therein, a funnel-shaped filter in registry with the inner faces of the three side members, and

means forming a plurality of notches formed on lower edges of the three side members, said plurality of notches being adapted to engage the upper edge of a container with the lower edges of the three side members supported thereon.

4,715,272

SYSTEM FOR PREPARING TORTILLAS

Fausto C. Mendoza, Calzada San Esteban Num 57, Naucalpan de Juarez, Mexico

Filed Feb. 27, 1986, Ser. No. 834,399

Claims priority, application Mexico, Jul. 2, 1985, 205863

Int. Cl.[4] A21B *1/42*

U.S. Cl. 99—339 **10 Claims**

1. A system for preparing tortillas, comprising in combination:

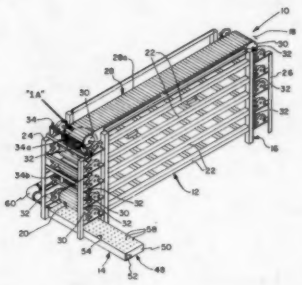
(a) a tortilla cooking oven including

(i) a support frame having an entrance at which uncooked tortillas are received and an exit from which cooked tortillas are discharged,

(ii) means mounted on said support frame defining a cooking path extending from said entrance toward said exit thereof and along which each tortilla travels through said oven and in which each of the opposite sides of the tortilla at separate portions of said path is subjected to cooking at the same temperature and over the same amount of time,

(iii) said cooking path defining means including a plurality of transporting members disposed on said support frame one above another with each member having an entry end and an exit end,

(iv) said plurality of transporting members including at



least one uppermost member for moving the tortillas resting on their one opposite sides along said cooking path and a lowermost member for moving the tortillas resting on their other opposite sides along said cooking path, and

(v) another transporting member being mounted on said support frame immediately below said lowermost member for receiving the cooked tortillas therefrom and moving them along a pre-cooling path to said exit of said oven; and

(b) a cooked tortilla cooling device associated with said tortilla cooking oven and being adapted to receive cooked tortillas from said pre-cooling path of said another transporting member at said exit of said oven so that said tortillas can be moved along a predetermined cooling path such that said tortillas are cooled by the time they reach an end of said cooling path.

4,715,273

COOKING APPARATUS

Gottfried Riesselmann, Achtern Diek 34, 2248 Vechta, Fed. Rep. of Germany

Filed Aug. 12, 1986, Ser. No. 895,657

Claims priority, application Fed. Rep. of Germany, Aug. 16, 1985, 3529424

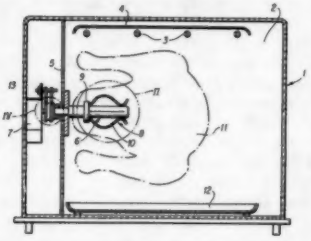
Int. Cl.[4] A22C *7/00*

U.S. Cl. 99—442 **21 Claims**

1. In an apparatus for cooking food and preferably food having or capable of being formed with an accessible cavity, the cooking apparatus having at least one heating element adapted to be inserted into the cavity in order to heat the food internally from within the cavity, the improvement comprising:

means associated with the heating element for supporting at least portions of the food in fixed relation to the heating

element wherein said means is in a first position when said heating element is in a first position and are biased towards



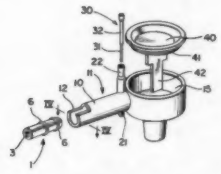
the food in a second position when said heating element is in a second position vis-a-vis said means.

4,715,274

EMULSIFIER UNIT PARTICULARLY FOR EMULSIFYING STEAM AND MILK TO PREPARE CAPPUCCINOS AND THE LIKE BEVERAGES

Luciano Paoletti, Florence, Italy, assignor to SPIDEM S.r.l., Pero Frazione Cerchiate, Italy

Filed Jan. 31, 1986, Ser. No. 824,853
Claims priority, application Italy, Jan. 31, 1985, 19311 A/85; Sep. 6, 1985, 22947/85[U]
Int. Cl.⁴ B01F *3/00*
U.S. Cl. 99—454 **10 Claims**



1. An emulsifier unit particularly for emulsifying steam and milk to prepare cappuccino and the like, comprising an emulsifying chamber having an outward dispensing opening, nozzle means defining a steam delivery channel and terminating in a nozzle positioned spaced from said chamber to define a suction chamber, a milk intake conduit and an external air intake conduit communicating with said suction chamber which in turn communicates with said emulsifying chamber whereupon steam introduced into said steam delivery channel jets out of said nozzle creating a vacuum in said suction chamber drawing milk and air into same to mix and emulsify in said emulsifying chamber and to be discharged therefrom.

4,715,275

APPARATUS FOR PRODUCING FROZEN CONFECTIONS INCLUDING EDIBLE PARTICULATE MATERIAL

Harlan R. Getman, Toledo, Ohio, assignor to General Mills, Inc., Minneapolis, Minn.

Division of Ser. No. 608,887, May 10, 1984, Pat. No. 4,643,905.
This application Oct. 30, 1986, Ser. No. 925,823
Int. Cl.⁴ A23G *9/00*
U.S. Cl. 99—494 **17 Claims**

1. An apparatus for producing confections comprising, in combination:

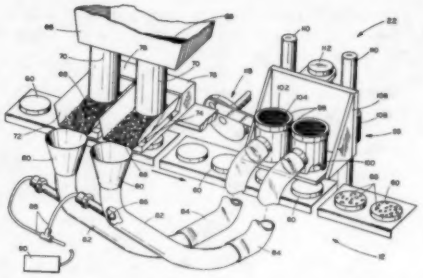
means for providing a flow of confectionary material,

means for severing such flow of material into individual bodies,

means for providing measured amounts of edible particulate matter,

means for receiving said measured amounts of edible particulate matter and applying said matter to said individual bodies,

means for reciprocating said receiving means into and out of at least close proximity with said individual bodies, and



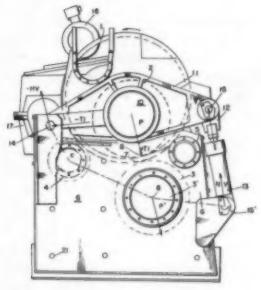
conduit means extending generally between said providing means and said receiving means for transporting such measured amounts of edible particulate matter from said providing means to said receiving means.

4,715,276

MECHANICAL CONTINUOUS DEWATERING PRESS

Vaino T. Saalasti, Arinatie 4, SF-00370 Helsinki 37, Finland

Continuation of Ser. No. 604,158, Apr. 26, 1984, abandoned.
This application Oct. 6, 1986, Ser. No. 915,852
Int. Cl.⁴ B30B *3/06, 9/20*
U.S. Cl. 100—121 **5 Claims**



1. A dewatering press for expressing water from wet bark including a perforated, revovling drum disposed in an inclined operating position and through which material to be dewatered runs from an upper end to a lower end, more than one support roll for supporting said drum in said operating position, and a press roll in pressing contact with, and revolving inside, the drum, the material to be dewatered being compressed between the drum and the press roll several times, characterized in that: said drum revolves between a drum pressing counter roll and said press roll, and said press roll and said counter roll are disposed opposite one another, and during compression of said material to be dewatered, said press roll presses said drum against said counter roll and said more than one support roll, the counter roll countering the force of the press roll and the drum when the press roll is moved into compression with the bark pressed against the inside of the drum, so that most of the force acts upon the counter roll, thus reducing the force which would otherwise be applied to said support rollers, such that balancing of the machine may be achieved during compression of the wet bark, said support rolls and said counter roll being mounted between two end plates, at least one of said plates being easily removeable, said

support rolls being of smaller diameter than the counter roll and being disposed on opposite sides of said counter roll and a little higher than the location of the counter roll.

4,715,277

TYPE SELECTION MECHANISM FOR A PRINTER

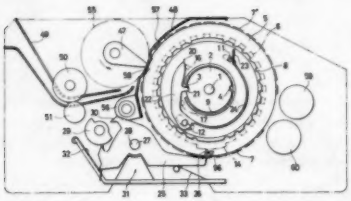
Fumihisa Hori, Takizawa, Japan, assignor to Alps Electric Co., Ltd., Japan

Filed Dec. 3, 1986, Ser. No. 937,348

Claims priority, application Japan, Dec. 25, 1985, 60-198212[U]; Dec. 27, 1985, 60-293089; Feb. 7, 1986, 61-24100; Feb. 7, 1986, 61-24101; Feb. 17, 1986, 61-30660

Int. Cl.[4] B41J *1/48*

U.S. Cl. 101—93.28 **6 Claims**



1. A printer comprising:

a drive shaft having axial grooves along the circumferential surface thereof;

printing wheels rotatably mounted on said drive shaft and each having a group of types along the circumferential surface thereof;

a drive claw of each said printing wheel and having a projection engageable with said grooves of said drive shaft;

a selection ratchet pivotably mounted on said printing wheel via said drive claw and having an engagement means engageable with said drive claw and a series of teeth formed along the circumferential margin thereof; and

a selection claw engageable with said teeth of said selection ratchet to selectively stop the rotation of said selection ratchet;

said printing wheel being linked to and rotated by said drive shaft when said projection of said drive claw engages said groove of said drive shaft;

said selection claw engaging said teeth of said selection ratchet during type selection to latch same, so that when said engagement means of said selection ratchet engages said drive claw, said projection of said drive claw disengages from said groove of said drive shaft and detaches said printing wheel from said drive shaft.

4,715,278

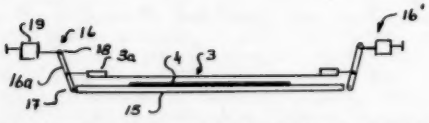
SQUEEGEE ARRANGEMENT FOR SILKSCREEN PRINTERS

Sylve J. D. Ericsson, Tumba, Sweden, assignor to Svecia Silkscreen Maskiner AB, Norsborg, Sweden

Filed Jun. 27, 1986, Ser. No. 879,604

Int. Cl.[4] B05C *17/04*

U.S. Cl. 101—123 **8 Claims**



1. A squeegee arrangement for silkscreen printing machines, comprising two squeegees arranged side-by-side and made from a somewhat flexible material, and respective squeegee holders, in which arrangment the squeegees are arranged to move relative to a stencil having a printing pattern provided thereon and located above a material substrate to be printed upon and supported on a stencil frame, said sqeegees being arranged to press print-forming substance through the stencil and onto the material substrate during said relative movement, and in which arrangment a plane extending centrally through respective squeegees forms an obtuse angle with the stencil and the material substrate in relation to the directional plane of squeegee movement, wherein the centrally located planes of respective squeegees subtend therebetween an angle of less than 120° and greater than 60°; and one of said squeegees is arranged to co-act with the stencil to effect printing in a first direction of squeegee movement, the other squeegee is arranged to co-act with the stencil to effect printing in a second direction opposite to said first direction; adjustment means for adjusting the angular range during a printing sequence; and means for displacing the stencil in a direction opposite to the direction of squeeges movement and compensate for discrepancies occurring in the print-pattern of the stencil on the substrate material as a result of stencil strength, said means for displacing the stencil connected to the stencil frame and displacing the frame in response to movement of said squeegees.

4,715,279

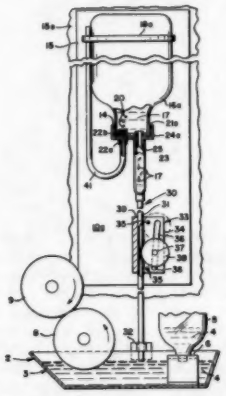
SUPPLEMENTARY LIQUID DISPENSING DEVICE

Rocco J. Albanese, 2296 Westside Dr., Rochester, N.Y. 14624

Filed Feb. 6, 1987, Ser. No. 12,052

Int. Cl.[4] B41L *25/12*

U.S. Cl. 101—148 **9 Claims**



1. A supplementary liquid dispensing device for continuously replacing alcohol lost from a fountain solution of a dampening system in a lithographic printing press, said dampening system having a fountain solution tray for containing said fountain solution therein, reservoir means for supplying said fountain solution to said tray at a given level therein, a rotatable fountain roller communicating with said fountain solution in said tray for wetting said fountain roller with said fountain solution, said supplementary liquid dispensing device comprising:

(a) a frame,

(b) bottle means for containing said alcohol therein,

(i) said bottle means includes a bottle mounted on said frame,

(c) piping means connected to said bottle means for gravity flowing of said alcohol directly into said fountain solution in said fountain tray and disposed in co-operative relationship with said rotatable fountain roller for mixing said alcohol with said fountain solution, and

(d) valving means connected to said piping means for controlling said flow of said alcohol directly into said tray and

said fountain solution at a rate substantially equal to the rate of loss of said alcohol from said fountain solution.

4,715,280

POLE BODY FOR AN ELECTRIC FUZE, METHOD OF MANUFACTURING AND METHOD OF USING THE POLE BODY

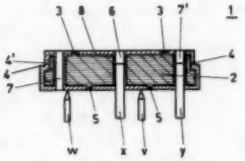
Alfred Wittwer, Niederglatt, Switzerland, assignor to EMS-Inventa AG, Zürich, Switzerland

Filed Apr. 22, 1985, Ser. No. 725,959

Claims priority, application Switzerland, May 24, 1984, 2548/84

Int. Cl.⁴ F42B *3/14*; B65D *5/12*

U.S. Cl. 102—202.8 **26 Claims**



1. A pole body for an electric fuze, comprising:

an insulating carrier element;

a metal layer provided on said insulating carrier element and forming at least one detonating bridge;

said metal layer on said insulating carrier element defining a surface; and

said insulating carrier element partially protruding into said metal layer on said insulating carrier element and forming a common plane with said surface of said metal layer.

4,715,281

IMPACT SWITCH FOR FUSES

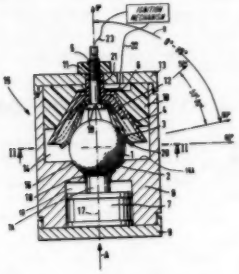
Horst Dinger, Tennenbronn, and Horst Moosmann, Schramberg, both of Fed. Rep. of Germany, assignors to Gebrüder Junghans GmbH, Schramberg, Fed. Rep. of Germany

Filed Sep. 5, 1986, Ser. No. 903,714

Claims priority, application Fed. Rep. of Germany, Sep. 26, 1985, 3534309

Int. Cl.⁴ F42C *19/06*

U.S. Cl. 102—216 **4 Claims**



1. An impact switch in a projectile of the type in which an electrical explosives-igniter is actuated in response to projectile impact, said switch comprising:

a housing comprising a rigid conical surface forming a conical recess centered along an axis extending in the fore-aft direction of the projectile,

first and second contacts, at least one of which being movable into engagement with the other for completing an electrical circuit to actuate the explosives-igniter, and

a spherical member movable in response to projectile impact for displacing said one contact into engagement with the other, said spherical member disposed in said recess so as to be movable along said rigid conical surface in directions angled relative to said axis to produce interengagement of said contacts in response to non-frontal impacts of the projectile,

wherein said one contact comprises a contact spring having a plurality of flexible arms overlaying and contacting said spherical member so that at least one of said arms is flexed outwardly by said spherical member into engagement with said other contact, said other contact being hood-shaped and surrounding said arms.

4,715,282

CLUSTER BOMB GRENADE WITH MEANS FOR SPIN RATE ATTENUATION

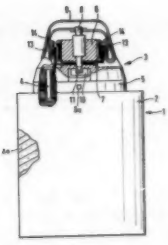
Avraham Rosenberg, Holon, and Carol Ziner, Rishon Le-Zion, both of Israel, assignors to The State of Israel, Ministry of Defence, Israel Military Industries, Israel

Filed Oct. 23, 1986, Ser. No. 922,343

Claims priority, application Israel, Dec. 18, 1985, 77377

Int. Cl.⁴ F42B *13/50, 25/22*

U.S. Cl. 102—227 **6 Claims**



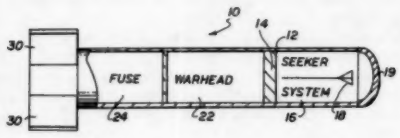
1. In a grenade adapted to be packed into a cargo projectile together with a plurality of its kind to form a cluster bomb, comprising a body housing a detonable charge; a rear portion housing a fuse and a striker pin adapted to advance towards the fuse along a predetermined path when the grenade hits a target thereby to ignite the fuse, movable blocking means for blocking the path of the striker pin towards the fuse when the grenade is in the unarmed state, which movable blocking means are movable towards a non-blocking position and are locked in the blocking position through engagement by the striker pin when said striker pin is in a locking position; a drag tape connected to the rear of the striker pin which is folded in the unarmed state of the grenade and is unfolded upon release of the grenade from the cargo projectile whereby the striker pin is retracted from engagement with said moveable blocking means to an unlocking position and the latter move into a non-blocking position whereupon the grenade is armed; the improvement by which said grenade comprises:

(i) a plurality of telescoping wings swingably mounted on said rear portion in a centrosymmetrical arrangement and adapted to swing from a folded to an unfolded position;

(ii) retainer means releasably coupled to said striker pin for retaining said wings in the folded position when said striker pin is in said locking position with said retainer means coupled thereto and for releasing said wings for swinging movement to the unfolded position when said striker pin is retracted to said unlocking position with said retainer means uncoupled therefrom, which retainer means are adapted to be jettisoned upon retraction of the striker pin to said unlocking position; and

(iii) stop means for arresting the wings in a desired unfolded position.

4,715,283
GUIDED MISSILE
William C. Yengst, Solana Beach, Calif., assignor to Science Applications International Corporation, San Diego, Calif.
Filed Nov. 18, 1986, Ser. No. 932,227
Int. Cl.[4] F42B *23/24, 25/20*
U.S. Cl. 102—401 9 Claims



1. In combination in a guided missile for directing the guided missile to railroad tracks and for providing for the disposition of the missile under a railroad bed beneath the tracks to derail an approaching train,

a housing made from a thick and strong metal, the housing having a blunt nose made from a compressible material,

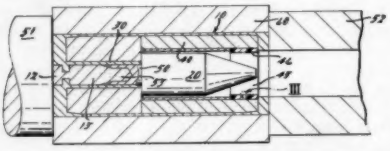
the housing having a relatively thick bulkhead at an intermediate position along the length of the housing,

a seeker system in the housing between the bulkhead and the nose for homing the guided missile on the railroad tracks,

a warhead in the housing at an intermediate position in the housing, and

a fuse in the housing at a rearward position in the housing.

4,715,284
TELESCOPED AMMUNITION CONSTRUCTION FOR REDUCING BARREL EROSION
James D. Hendry, Huntington Beach, and Lee A. Tobias, Santa Ana, both of Calif., assignors to Ford Aerospace & Communications Corp., Dearborn, Mich.
Filed Nov. 24, 1986, Ser. No. 934,527
Int. Cl.[4] F42B *5/02*
U.S. Cl. 102—434 3 Claims



1. A telescoped ammunition round comprising a propellant charge means having an axial cavity and supplying firing power for said ammunition round;

a projectile means housed within said cavity for being fired from said ammunition round; and

a wear reducing additive means coupled to the forward portion of said propellant charge means adjacent said axial cavity, said wear reducing additive means being integrally molded to said propellant charge means adjacent the forward portion of said axial cavity thereby strengthening said propellant charge means and accurately positioning said wear reducing additive means, being in the form of hard pellets pressed into said propellant charge means, and having extensions protruding into said propellant charge means to improve coupling between said wear reducing additive and said propellant charge means.

4,715,285
ADDITIVE SEALING SLEEVE FOR LARGE-CALIBERED CANNON AMMUNITION FOR THE PROTECTION OF THE WEAPON BARREL
Roland Höller, Nuremberg, Fed. Rep. of Germany, assignor to Diehl GmbH & Co., Nuremberg, Fed. Rep. of Germany
Filed Dec. 9, 1986, Ser. No. 939,538
Claims priority, application Fed. Rep. of Germany, Dec. 19, 1985, 3544907
Int. Cl.[4] F42B *5/24*
U.S. Cl. 102—435 3 Claims

1. Additive sealing sleeve for large-calibered artillery ammunition adapted for the protective treatment of a weapon barrel, said sleeve comprising a coated textile fabric which is assembled in a shell casing in the form of a lining, said fabric being covered as a support for a mixture constituted of wax and titanium dioxide; the improvement comprising in that the mixture contains a thickening medium which forms a stiffening three-dimensional meshwork, said thickening medium containing polybutylene and a combustion enhancing agent.

4,715,286
CONVEYER SYSTEM
Preston K. Parker, and Roy T. Toutant, both of Louisville, Ky., assignors to General Electric Company, Louisville, Ky.
Filed Nov. 27, 1985, Ser. No. 802,389
Int. Cl.[4] B65G *17/40*
U.S. Cl. 104—88 7 Claims

1. A conveyor system comprising:

a first horizontal trackway having a flat movable flexible chain extending between a plurality of work stations, said trackway having a loop section at one end thereof;

a plurality of pallets movable by frictional engagement with the flexible chain for carrying work pieces along the trackway between the work stations;

a second trackway adjacent the first trackway loop section and having a continuous flat flexible chain, said second trackway. having an upper level section and a lower level section with the upper level section being in the same horizontal plane as the first trackway and having two legs connected by an intermediate section with both of the legs in pallet transfer communication with the first trackway, the lower level section of the second trackway being spaced below the upper level section and having two legs connected by an intermediate section, each leg of the lower level section being connected to a corresponding leg of the upper level section to form a continuous loop;

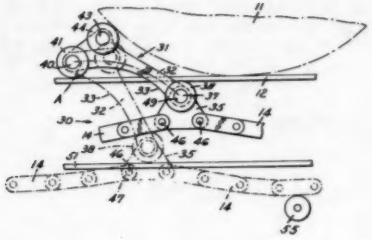
drive means for moving the continuous second trackway independent of the first trackway; and

switching means for diverting the pallets to either the first trackway loop section or the upper level of the second trackway.

4,715,287
VEHICLE CONVEYOR AND WHEEL ENGAGING DOLLY
Robert J. Wentworth, Northville, and Graham J. Astley, Novi, both of Mich., assignors to Belanger, Inc., Northville, Mich.
Filed Jan. 8, 1987, Ser. No. 1,595
Int. Cl.[4] B61B *10/04, 13/12;* B65G *17/24, 19/26*
U.S. Cl. 104—172.3 10 Claims

1. A tire engaging roller dolly adapted to be connected to a chain forming part of a conveyor for transporting a vehicle in one direction along a substantially horizontal track, comprising an arm having a surface on the side of the arm adapted to face the chain, said arm being hingedly connected on a first end to a connector link of the chain by a first pin which is adapted to extend through the link and the arm, a first pair of rollers being secured to the first pin, said arm having a second pin disposed at a second end space from the first and and aligned with the first rollers, a second pair of rollers being secured to the second pin, a third pin disposed on the arm parallel to the first and

second pins at a point intermediate the first and second pins and spaced from said aligned first and second rollers, said third pin having a third pair of rollers secured thereon for engaging a tire of a vehicle adapted to be moved by the conveyor, whereby said second pair of rollers is adapted to ride upon the upper surface of the track with the third pair of rollers in a first



position and said first pair of rollers spaced below said track until the third pair of rollers engages the tire, and upon engaging the tire, the third pair of rollers is adapted to roll upwardly along the vehicle wheel until the first pair of rollers are pivoted about the second pair of rollers and into contact with the lower surface of the track.

4,715,288

APPARATUS FOR THE OVERHEAD TRANSPORTATION OF HEAVY LOADS ON A MONORAIL

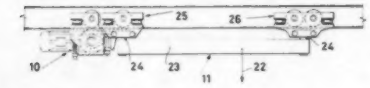
Nicola Catena, Leumann, Italy, assignor to Fata European Group S.p.A., Turin, Italy

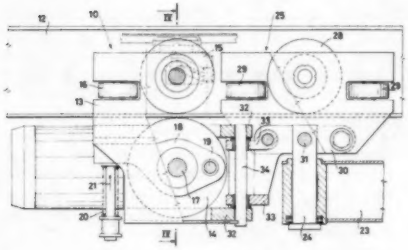
Filed Apr. 29, 1986, Ser. No. 857,181

Claims priority, application Italy, May 23, 1985, 21925/85[U]

Int. Cl.[4] B61B *3/02*

U.S. Cl. 105—154 **7 Claims**





1. An apparatus for the overhead transportation of loads on a monorail comprising, at least one truck (**11**), a tractive trolley (**10**), a vertically positioned pivot pin (**34**) articulately connecting said truck (**11**) and said tractive trolley (**10**), said truck (**11**) comprising first and second terminal trolleys (**25, 26**), bars (**24**) pivotally extending downwardly from said first and second terminal trolleys (**25, 26**), a girder (**23**) having ends mounted on said first and second terminal trolleys (**25, 26**), and a first and second pair of guide wheels mounted on said first terminal trolley (**25**), a first fork (**32**) having a bifurcated section with aligned holes therethrough, said pivot pin (**34**) being mounted in said aligned holes, a second fork (**33**) having a bifurcated section with aligned holes therethrough, said pivot pin (**34**) passing through said aligned holes of said second fork (**33**), said first fork (**32**) being fixed to said tractive trolley (**10**), said second fork (**33**) being fixed to said first terminal trolley (**25**) and said pivot pin (**34**) and first pair of guide wheels having axes being positioned in the same vertical plane.

4,715,289

APPARATUS FOR CONTROLLING VIBRATION OF VEHICLE

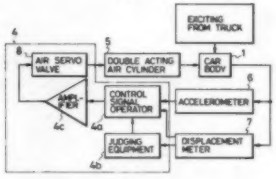
Isao Okamoto, Musashino; Motomi Hiraishi, Kudamatsu; Hideo Takai, Hikari; Kenjiro Kasai, and Katsuyuki Terada, both of Kudamatsu, all of Japan, assignors to Japan National Railway and Hitachi, Ltd., both of Tokyo, Japan

Filed May 29, 1986, Ser. No. 868,025

Claims priority, application Japan, May 31, 1985, 60-116420

Int. Cl.[4] B61F *3/08, 5/24, 5/06*

U.S. Cl. 105—199.2 **6 Claims**



1. An apparatus for controlling the vibration of a vehicle, comprising:

a truck;

a car body;

springs for supporting said car body on said truck;

a fluid pressure-acting mechanism arranged between said truck and said car body for controlling forces acting between said car body and said truck with a pressure fluid;

an acceleration detector for detecting acceleration of said car body;

means for determining displacement relatively generated between said car body and said truck due to a steady acceleration acting against said car body;

a fluid controller for controlling said pressure fluid supplied to said fluid pressure-acting mechanism; and

a controller for generating a vibration suppressing control signal based on an output from said acceleration detector, for calculating a displacement value, corresponding to said displacement relatively generated between said car body and said truck contained in said vibration suppressing control signal based on an output from said means for determining displacement generated relatively between said car body and said truck and for subtracting said displacement value from said vibration suppressing control signal to provide a control signal for controlling said fluid controller.

4,715,290

HUNTING CONTROL SIDE BEARING

Charles N. Hood, II, Deerfield, Ill., assignor to AMSTED Industries Incorporated, Del.

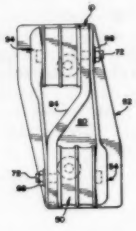
Filed May 19, 1986, Ser. No. 864,604

Int. Cl.[4] B61F *5/14*

U.S. Cl. 105—199.3 **7 Claims**

1. An improved side bearing for use in railway cars in which the frictional interface between said side bearing and a part secured to one of a carbody and truck bolster takes place in one or more substantially vertical planes, said side bearing comprising a resilient cartridge means having two opposite ends, mounting means to secure one end of said cartridge with respect to one of said carbody and truck bolster, and friction

means covering the other of said ends of said resilient cartridge, wherein said friction means is a fogged metal part



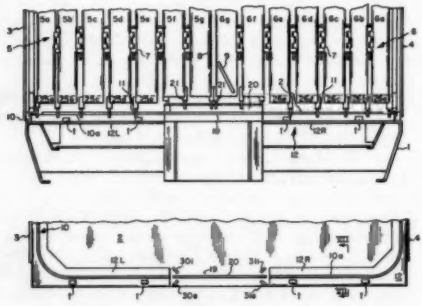
having a handle by which it is secured substantially normal to said mounting means and a body portion held against and covering said other end of said resilient cartridge.

4,715,291

RAILROAD CAR DOOR BOTTOM GUIDE RAIL SYSTEM

James D. Hart, Grove City, Pa., assignor to Trinity Industries, Inc., Dallas, Tex.

Filed Jul. 2, 1986, Ser. No. 881,332
Int. Cl.[4] B61D *3/18*; B60J *5/14*
U.S. Cl. 105—378 **11 Claims**



1. In a railroad car arranged to transport vehicles, a floor; a roof; a pair of spaced side walls; at least one door assembly; means for suspending said door assembly for movement from a closed position at an end of said railroad car to an open position adjacent a side wall for the loading and unloading of vehicles thereon; a rail for securing the bottom edges of said door assembly; and a plurality of spaced fingers attached to the bottom edges of said door assembly to straddle said rail and provide slidable movement of said door assembly relative to said rail, the improvement comprising:

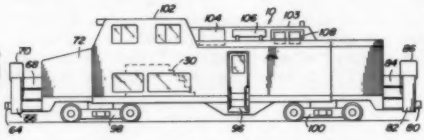
a platform attached to said end of said railroad car extending along at least one side of said railroad car and positioned between a lower end of a side wall and an adjacent edge of said floor, said platform spaced a distance below and in parallel relation to said floor, a portion of said rail being positioned on said platform so that the upper edge of said portion of rail does not extend above the level of said floor at least in areas through which the tires of a vehicle pass during loading and unloading of said railroad car, whereby said door assembly may be moved along the rail adjacent to and inside of said side walls to an open position for the loading and unloading of vehicles thereon.

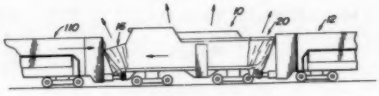
4,715,292

HEAD END VEHICLE WITH CREW ACCOMMODATIONS WITH LOCOMOTIVE AND OTHER CONTROLS

Michael J. Pavlick, 1538 Daws Cir., Norristown, Pa. 19403; James C. McQueston, 466 Hopwood Dr., Warminster, Pa. 18974; Walter S. Eggert, Jr., 26 Moredon Rd., and Lionel Sherrow, 737 Dale Rd., both of Huntington Valley, Pa. 19006

Filed Sep. 13, 1985, Ser. No. 776,068
Int. Cl.[4] B61D *15/06, 17/00*
U.S. Cl. 105—456 **8 Claims**





1. In combination:

(a) a non-propulsion control rail vehicle providing a lead car in a train;

(b) a self-propelled rail vehicle including propulsion means for directly pushing said lead vehicle;

(c) said control vehicle including a main body having a plurality of floor levels therein and including a plurality of partitioned areas to provide working areas and accommodations for a crew;

(d) one of said partitioned areas including a cab area having a highest floor level in said control vehicle to permit high visibility in forward and rear directions;

(e) front and rear structures on the front and rear ends of said control vehicle disposed to collapse and absorb energy when subjected to impact forces;

(f) a central frame structure including said cab area disposed between said front and rear structures, and

(g) said central frame including protective members to limit the distance said front and rear structures will collapse when high impact forces are applied thereto to prevent the collapse of said central frame.

4,715,293

BODY-SUPPORTED HAND-OPERATED INSTRUMENT DESK

Richard W. Cobbs, P.O. Box 609, North Amherst, Mass. 01059

Filed Dec. 9, 1986, Ser. No. 939,536
Int. Cl.[4] A47B *23/00*
U.S. Cl. 108—43 **10 Claims**

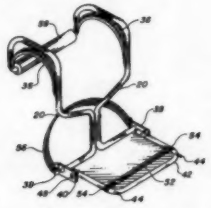
1. A body-supported instrument desk retained over the shoulders of ones body for holding a hand operated portable instrument comprising:

(a) a tubular frame member in generally a U-shape having a middle and ends, formed in such a manner as to conform to the back portion of ones body and over the shoulders with the middle joining contiguously and the ends spread apart, for resting on ones shoulders and providing structure therewith,

(b) a pair of brackets having slots therein in crescent shape permanently affixed to the ends of said tubular frame member providing a vertical mounting base,

(c) a rectangular shaped tubular table member having a slot in each end pivotally disposed upon the brackets in a horizontal direction defining an enclosed table area on three sides with the tubular frame member forming the fourth edge of the table member,

(d) table member manual actuator adjusting means having



hand variable adjustment providing predetermined angular displacement of the table member relative to the brackets allowing adjustment of the angle of the table to fit the individuals body and accessibility requirements,

(e) a table top engaging the table member and bottom vertical frame members providing a support for holding the portable instrument while the desk is retained portably on ones shoulders,

(f) a pair of shoulder straps attached on one end to the vertical frame members and on the other to the back support member defining a cradle therebetween formably fitting ones shoulders for retaining the weight of the desk evenly thereupon, and

(g) a resilient pad attached to the frame contiguous with the users back providing a comfortable surface for comfort and adaptability to different body contours.

4,715,294

PALLET CONSTRUCTION

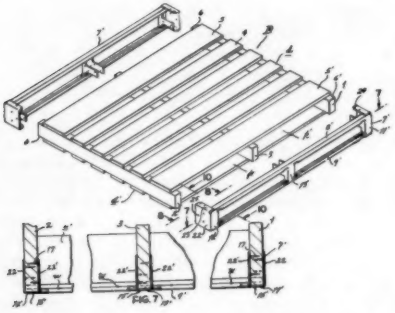
Thomas N. Depew, 10 Sunningdale Dr., St. Louis, Mo. 63124

PCT No. PCT/US86/02208, § 371 Date Oct. 20, 1986, § 102(e) Date Oct. 20, 1986

PCT Filed Oct. 20, 1986, Ser. No. 938,169

Int. Cl.⁴ B65D *19/18*

U.S. Cl. 108—51.1 **25 Claims**



1. A pallet comprising spaced-apart stringers, a plurality of deckboards secured to upper and lower edges of said stringers in axial transverse relation thereto to define upper and lower decks, at least one end deckboard of each deck being spaced inwardly from the adjacent ends of the stringers to form end spacings, a protective device provided at said at least one end of said pallet comprising a plurality of stringer end caps for engagingly receiving the projecting end of the related stringer and being of general U-shape in cross-section, said end caps each having a pair of arms for disposition against the proximate side face portions of the related stringer and an interconnecting web for abutment on the inner face thereof against the confronting end face of such stringer, said arms being of such dimension lengthwise of the pallet as to project a substantial distance between the adjacent deckboards of the upper and lower decks, means for securing said arms to the proximate stringer in the zones thereof between said upper and lower decks, upper and lower rigid elongated members in axial parallel relation to said deckboards, the upper and lower elongated members each being of flat-sided tubular configuration and fixedly secured upon the upper edges of said stringer end caps for fitted reception within the end spacings for snug abutment of said elongated members against the proximate end face of the adjacent deckboard and against the adjacent edge of the stringers, said elongated members being of such transverse dimension as to be flush with the webs of the engaged stringers.

4,715,295

OVERBED TABLE

Daniel A. Hartman, Sunman, and L. Dale Foster, Brookville, both of Ind., assignors to Hill-Rom Company, Inc., Batesville, Ind.

Filed Jul. 26, 1985, Ser. No. 759,635

Int. Cl.⁴ A47B *57/00*

U.S. Cl. 108—93 **4 Claims**

1. An improved table providing two usable horizontal surfaces, comprising:

(a) an upper horizontal table surface;

(b) a lower horizontal table surface positioned generally under said upper horizontal table surface, so that the lower horizontal table surface is not usable; said upper and lower table surfaces being mounted on slide members;

(c) means for concurrently moving said upper and lower horizontal table surfaces in opposite directions to expose the lower horizontal table surface and to render said lower horizontal table surface available for use such that said upper table surface may be moved in either one of two directions relative to said lower table surface and movement of said upper table surface in one of said directions will cause movement of said lower table surface in the other of said two directions, said means for concurrently moving said tabie surfaces comprising a pivot means operably connected to the upper and lower table surfaces, said pivot means comprising an elongate pivot bar assembly having bearing means mounted on each end thereof and confirgured to cooperate with a generally V-shaped channel in the undersurface of said upper table surface and a generally elongate channel formed in the underside of said lower table surface and extending generally transverse to

the direction of movement of said lower table surface, wherein movement of said upper table surface in one direction automatically results in movement of said lower table surface in the opposite direction; and

(d) latch means positioned to hold said table surfaces in a position where the upper surface is directly over the lower surface and means for releasing said latch means to permit said table surface to be concurrently moved in opposite directions.

4,715,296

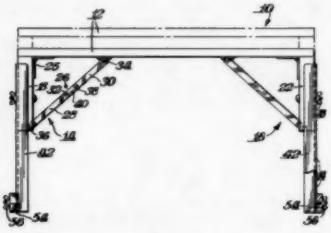
UTILITY BENCH

William T. Wilkinson, c/o Connolly & Hutz, P.O. Box 2207, 1220 Market Bldg., Wilmington, Del. 19899-2207

Filed Apr. 3, 1986, Ser. No. 847,672

Int. Cl.[4] A47B *3/02*

U.S. Cl. 108—116 **6 Claims**



1. An adjustable utility bench for being disposed a vertical distance above a support surface comprising an elongated planar one-piece support platform having an underside and a pair of side edges and a pair of spaced ends, a mounting unit secured to each of said ends, each mounting unit comprising a pair of legs hingedly mounted to said platform by a hinging mechanism secured to the lower end of each of said legs and secured to said underside of said support platform at a location inwardly of said side edges for being folded against said underside of said platform during periods of storage, a brace interconnecting said legs whereby said legs are jointly movable between its use and storage conditions, said brace of each mounting unit being connected to its respective pair of legs at an angle thereto by said brace being connected at one end to the lower portion of one of said pair of legs and at its opposite end to the upper portion of the other of said pair of legs, said braces of both mounting units being at opposite angles to each other, an extension secured to each of said legs, adjustable securing means mounting each of said extensions to a respective leg whereby the vertical distance said extensions project away from said platform may be varied to control the height of said platform at one of at least three different fixed heights, and a support member spanning and extending laterally beyond and detachably connected to a respective pair of said extensions of each mounting unit to provide stability to said bench.

4,715,297

SAFE CONSTRUCTION AND REBAR COUPLING DEVICE FOR USE THEREWITH

Robert J. Lichter, 15571 Placid Cir., Huntington Beach, Calif. 92647

Filed Feb. 27, 1986, Ser. No. 834,205

Int. Cl.[4] E05G *1/00*

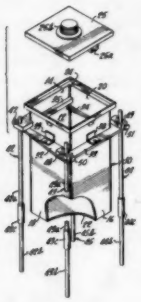
U.S. Cl. 109—50 **17 Claims**

1. A safe construction comprising:

safe-wall means forming a valuables receiving chamber and being configured for pouring of concrete thereabout;

connector means attached to said safe-wall means;

a plurality of rebar assemblies attached to said connector means, each of said rebar assemblies including at least one rebar section having one end thereof attached to said connector means and the other end thereof attached to a coupler device, each of said coupler devices being formed of a non-rusting material, each of said coupler devices being positionable relative to the ground with said coupler device in a position for at least partial embedment in the



poured concrete along with said at least one rebar section of said rebar assemblies, said coupler device acting as a barrier to the formation of rust on said at least one rebar section.

4,715,298

ELECTRICALLY POWERED IMPRINTER

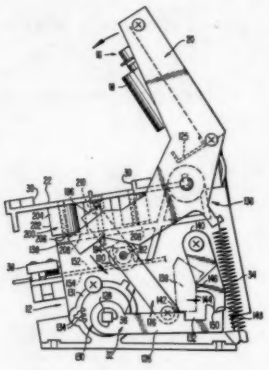
Walter R. Weickert, Petersburg, and Paul J. Foley, Kitchener, both of Canada, assignors to National Business Systems, Inc., Ontario, Canada

Continuation of Ser. No. 780,989, Sep. 27, 1985, Pat. No. 4,655,132. This application Dec. 1, 1986, Ser. No. 936,605

The portion of the term of this patent subsequent to Apr. 7, 2004, has been disclaimed.

Int. Cl.[4] B41F *3/04*

U.S. Cl. 101—269 **28 Claims**



1. In a motor operated imprinter of the type having a base having means for receiving a print bearing element having printing to be imprinted and a print receiving element to be imprinted with the printing by a motor powered rolling platen means as it moves from a first position to a second position, a head means pivotably connected to the base which is pivotable between an open position, providing access to the means for receiving, and a closed position positioning the head means for imprinting, a latching means, having latched and unlatched positions, for holding the head in its closed position when latched; and means for causing the head means to rotate to its open position upon the unlatching of the laching means, a

mechanism for braking the rotation of the head means from its closed position to its open position comprising:

(a) a head arrestor means having a first position which does not engage the head means and a second position which engages a part of the head means during rotation of the head means to the open position to brake the rate of pivoting of the head means to the open position; and

(b) means for moving the head arrestor means from the first position to the second position into engagement with the part of the head means in response to movement of the rolling platen means toward the second position which causes the head means to pivot at a braked rate of pivoting.

4,715,299

COMPOUND RESOURCE RECOVERY FURNACE

Steven L. Mann, P.O. Box 33, Cheshire, Conn. 06410

Filed Dec. 22, 1986, Ser. No. 945,013
Int. Cl.[4] F23G *5/08*
U.S. Cl. 110—235 **15 Claims**

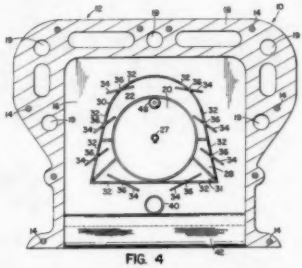


FIG. 4

1. A compound furnace comprising an elongated outer shell having a charging end and a discharging end, an inner chamber assembly disposed within and extending longitudinally of said shell and including first wall means for defining an inner chamber in communication with said charging end and said discharging end and second wall means surrounding at least a portion of said first wall means for cooperating with said first wall means to define an intermediate chamber, said outer shell cooperating with said inner chamber assembly to define an outer chamber, means for heating said inner chamber, regulating means associated with said second wall means for controlling communication between said intermediate chamber and said outer chamber, and controlling means responsive to temperature within said outer chamber for operating said regulating means to vary the degree of communication between said intermediate chamber and said outer chamber whereby to alter temperature within said outer chamber.

4,715,300

METHOD OF DISPOSING OF MATERIALS BY DISSOLVING IN ACID AND THEN INCINERATING

Rocky C. Costello, and Robert L. Dixon, both of Houston, Tex., assignors to Stauffer Chemical Company, Westport, Conn.

Filed Apr. 27, 1987, Ser. No. 43,052
Int. Cl.[4] F23G *7/00*
U.S. Cl. 110—346 **8 Claims**

1. A method of disposing of acid-dissolvable solid materials which comprises:

(a) dissolving the acid-dissolvable materials in a strong mineral acid to form an acid solution comprising the dissolved material; and

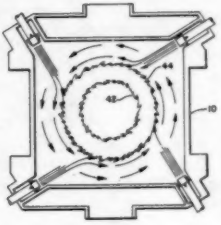
(b) feeding the acid solution from (a) to an incinerator for incineration.

4,715,301

LOW EXCESS AIR TANGENTIAL FIRING SYSTEM

Joseph D. Bianca, Feeding Hills, and David K. Anderson, East Longmeadow, both of Mass., assignors to Combustion Engineering, Inc., Windsor, Conn.

Continuation of Ser. No. 843,419, Mar. 24, 1986, abandoned. This application Mar. 16, 1987, Ser. No. 26,223
Int. Cl.[4] F23D *1/00*
U.S. Cl. 110—347 **11 Claims**



1. A method of operating a tangentially fired pulverized coal furnace for purposes of achieving a better mixing of the coal and auxiliary air so that the excess air required for complete combustion of the coal is kept to a minimum and so that the quantity of coal, burnt or unburnt, impacting the upper furnace walls is lowered thus reducing plugging and fouling in the furnace comprising the steps of:

a. discharging into the furnace at each of a plurality of first levels pulverized coal and primary air such that the pulverized coal and primary air being discharged at each of said plurality of first levels is directed in a first direction tangentially to a corresponding one of a plurality of first imaginary circles each located in the center of the furnace thereby causing a fireball to be formed within the furnace that rotates in said first direction while moving within the furnace;

b. discharging into the furnace at each of said plurality of first levels secondary air such that the secondary air being discharged at each of said plurality of first levels is directed in said first direction tangentially to each of a corresponding one of said plurality of first imaginary circles each located in the center of the furnace;

c. discharging into the furnace at each of a plurality of second levels that are each located directly above a corresponding one of each of said plurality of first levels auxiliary air in a mass more than two times that of the primary air such that the auxiliary air being discharged at each of said plurality of second levels unlike the pulverized coal and the primary air and the secondary air being discharged at each of said plurality of first levels is directed in a second direction that is opposite to said first direction tangentially to a corresponding one of a plurality of second imaginary circles each located in the center of the furnace thereby causing a fireball to be formed within the furnace that rotates in said second direction while moving upwardly within the furnace; and

d. causing each fireball formed within the furnace to rotate in said second direction upon exiting from the furnace because of the influence exerted thereupon by virtue of the auxiliary air having a greater mass.

4,715,302

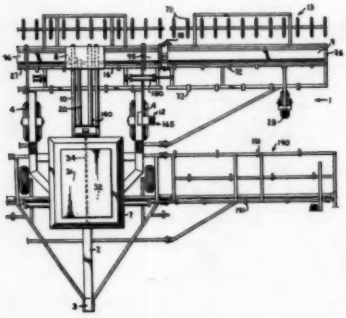
FOLDABLE DRILL IMPLEMENT WITH DIFFERENTIAL ASSEMBLY

Stanley E. Briggs, Minneapolis, Kans., assignor to Briggs Manufacturing, Inc., Minneapolis, Kans.

Continuation-in-part of Ser. No. 816,556, Jan. 6, 1986, abandoned, which is a continuation of Ser. No. 574,264, Jan. 26, 1984, Pat. No. 4,562,779. This application Apr. 23, 1986, Ser. No. 855,124

Int. Cl.[4] A01C *5/00, 7/16, 7/20*

U.S. Cl. 111—1 **6 Claims**



1. A foldable drill implement comprising:

(a) an implement frame having a tow bar for connection to a prime mover and a plurality of ground-engaging wheels for movable support over the ground in a first direction;

(b) a supply hopper mounted to said frame;

(c) a broadcast hopper mounted to said frame and spaced from said supply hopper, and extending generally transversely to said first direction;

(d) said implement frame having a center frame section and a plurality of wing frame sections oppositely positioned adjacent said center frame section and having ground-engaging wheels for support, said center frame section including pivot means connecting said wing frame sections to opposite ends of said center frame section for folding;

(e) said broadcast hopper including a central drill box mounted on said center frame section;

(f) said broadcast hopper including a plurality of wing section drill boxes mounted on a respective said wing frame section and extending generally longitudinally of said central drill box and in flow communication therewith, each of said wing section drill boxes having outer ends;

(g) a plurality of planter means supported by said frame and disposed along said broadcast hopper, said broadcast hopper being in flow communication with said planter means for broadcast of said material in the ground upon operational movement of said implement frame;

(h) a first supply auger supported by said frame and extending generally in said first direction, said first supply auger being connected to said supply hopper and to said broadcast hopper and being in flow communication therebetween;

(i) a first distribution auger supported by said frame and extending generally transversely to said first direction along said broadcast hopper, said first distribution auger being in flow communication with said first supply auger and adapted to transfer material from said supply auger to said central and wing drill boxes of said broadcast hopper; said first distribution auger having a right side auger shaft and a left side auger shaft;

(j) motive means connected to and driving said first supply auger and said first distribution auger;

(k) a differential assembly connected to said motive means for receiving power therefrom; said differential assembly connecting said right and left side auger shafts and differentially supplying power thereto in response to torque differentials applied to said right and left side auger shafts; and

(l) control means at said wing section drill box outer ends and sensitive to the presence of excess material delivered by respective said wing distribution augers, said control means being adapted to deactuate said first supply and distribution augers upon said presence of said excess material.

4,715,303

LUBRICATING DEVICE FOR SEWING AND EMBROIDERING MACHINES

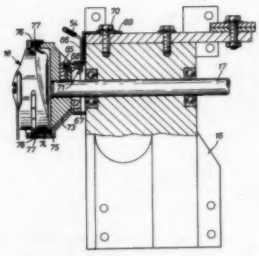
Edgar Busch, Trippstadt; Lothar Schilling, and Klaus Ziegler, both of Kaiserslautern, all of Fed. Rep. of Germany, assignors to Pfaff Industriemaschinen GmbH, Fed. Rep. of Germany

Filed Jun. 3, 1986, Ser. No. 870,076

Claims priority, application Fed. Rep. of Germany, Jun. 3, 1985, 8516167

Int. Cl.[4] D05B *57/08, 71/02*

U.S. Cl. 112—256 **6 Claims**



1. A lubricating device for the track of a rotating lock stitch loop taker of a sewing and embroidering machine, comprising a loop taker body having a hub portion, a rotatable loop taker arbor secured to said loop taker at the hub portion, a bearing block for rotatively mounting said loop taker arbor, said hub portion having a recess which comprises an oil chamber at its end facing said bearing block said arbor passing directly through said oil chamber before reaching the point at which it is secured to said hub portion, a fixed ring surrounding said loop taker hub portion enclosing a space between said hub portion and said bearing block a nozzle tube extending through the opening of said ring protruding into the recess of said loop taker hub portion for directing lubricating oil through an opening of said ring to the recess of said hub portion, a pump connected to said nozzle tube so as to supply lubricating oil to said recess portion, and a channel in said hub portion connecting said recess to the periphery of said loop taker so that the rotation of said loop taker produces a centrifugal force acting on the oil in the recess of said hub portion, to direct the oil, through said channel, to the periphery of said loop taker.

4,715,304

HYDROFOIL MARINE APPARATUS

Amiram Steinberg, Moshav Avichail, Israel

Continuation of Ser. No. 690,978, Jan. 11, 1985, abandoned. This application Apr. 22, 1986, Ser. No. 856,439

Int. Cl.[4] B63B *1/28*

U.S. Cl. 114—39.2 **19 Claims**

1. Hydrofoil marine apparatus comprising:

a hull, including at least one recess formed in the underside thereof;

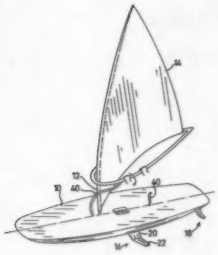
hydrofoil means comprising a plurality of foil assemblies, each assembly including first and second generally planar surface portions, said section portion lying below said first

portion when disposed in an operative orientation in the water;

pivotal mounting means for mounting said hydrofoil onto the hull and defining a pivot axis perpendicular to at least one of said first and second generally planar surface portions; and

means for selectably and variably determining the dihedral angle between the first and second planar surface portions and comprising:

selectable displacement means associated with said hydrofoil means and operative to assume a first operative



orientation when said hydrofoil means is in a first pivotal orientation and to assume a second operative orientation when said hydrofoil means is in a second pivotal orientation;

hinge means joining said first and second generally planar surface portions and operative to determine the dihedral angle therebetween; and

means fixedly coupled to said displacement means and to said hinge means for transferring displacement of said displacement means to operation of said hinge means for desired orientation thereof.

4,715,305

SHIP'S HULL

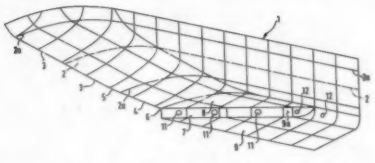
Göran Wilkman, Espoo; Timo Kotilainen; Juha Pulliainen, both of Helsinki, and Gustav Lindqvist, Espoo, all of Finland, assignors to Oy Wärtsilä AB, Helsinki, Finland

Filed Mar. 7, 1985, Ser. No. 708,970

Claims priority, application Finland, Mar. 12, 1984, 840995

Int. Cl.[4] B63B *35/08*

U.S. Cl. 114—40 **19 Claims**



1. A ship's hull that is adapted for operating an ice-filled waters and has a general frame form defining a substantially horizontal bottom surface and two opposite side surfaces, said hull having a rounded bow portion, the outline of which, in horizontal sections at and below the design waterline plane of the ship, and at least partially above the design waterline plane, is an at least substantially continuous curved arc from one side of the hull to the opposite side thereof, and said bow portion having a stem line that extends obliquely from said design waterline plane downwards in the rearward direction at an angle of at most 40 degrees to a horizontal plane, and said hull also having a wedge-shaped structure defined by two substantially vertical sides that converge in the direction from the stern of the hull towards the bow of the hull, said two sides meeting in an edge that extends substantially vertically downwards from the region of the lower end of said stem line.

4,715,306

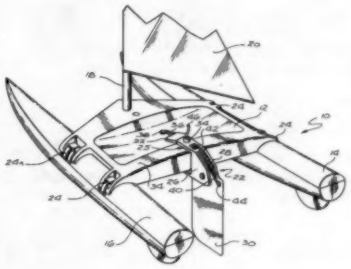
CATAMARAN WITH A STEERABLE CENTERBOARD APPARATUS AND AN IMPROVED DECK JOINT

Alan W. Horais, 1603 Steinhart Ave., Redondo Beach, Calif. 90278

Filed Apr. 4, 1986, Ser. No. 848,305

Int. Cl.[4] B63B *1/00*

U.S. Cl. 114—61 **11 Claims**



1. A steerable centerboard apparatus for a water going vessel having a deck with an opening extending therethrough, the deck being mounted to at least one hull, comprising:

a housing rotatably mounted to the deck of the vessel, said housing having a bore defined therethrough;

a board pivotally attached to said housing;

a tiller integral with said housing and extending into said deck, said tiller being movable by a user of said vessel for rotating said housing and said board about an axis substantially perpendicular to the direction of travel of said vessel, said board being pivotally attached to said housing about an axis perpendicular to this first-mentioned axis;

means for maintaining said tiller in a pre-defined position until a user of said vessel is ready to move said tiller;

a biasing element attached to an upper portion of said board and to said housing;

a rope attached to said board, said rope extending through said opening in said deck and through said bore in said housing, wherein said board can be moved from an upper position to a lower position by moving said rope through said opening and said bore; and

means for fixing said rope to said housing.

4,715,307

CONCRETE MARINE FLOAT AND METHOD OF FABRICATING SAME

Larry L. Thompson, Minneapolis, Minn., assignor to Rock Dock, Inc., Minneapolis, Minn.

Continuation-in-part of Ser. No. 439,752, Nov. 8, 1982, abandoned. This application Dec. 4, 1985, Ser. No. 805,198

Int. Cl.[4] B63B *5/20*

U.S. Cl. 114—65 A **3 Claims**

1. A method of fabricating a marine float, comprising:

(a) Providing a form having a generally rectangular configuration;

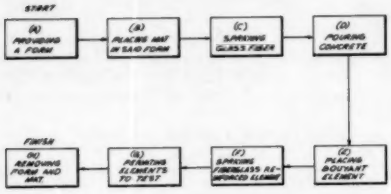
(b) Placing a texturing mat in said form;

(c) Spraying a layer of glass fiber reinforced concrete into said form over said mat to form a textured deck;

(d) Pouring a layer of standard aggregate concrete over said textured deck;

(e) Placing a buoyant element of expanded polystyrene foam on said layer of fiberglass reinforced cement;

(f) Spraying a layer of fiberglass reinforced cement over the sides and bottom of said buoyant element;

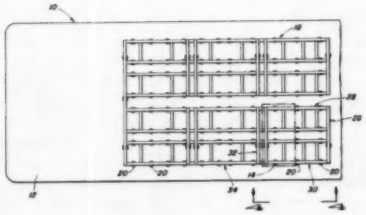


(g) Permitting the concrete elements to set; and
(h) Removing the form and textured mat.

4,715,308
GRID SYSTEM

William J. Denison; Lancing G. Smith, and Lonnie R. Walker, all of Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.

Filed Jul. 19, 1985, Ser. No. 756,884
Int. Cl.[4] B63B 25/00
U.S. Cl. 114—72 **20 Claims**



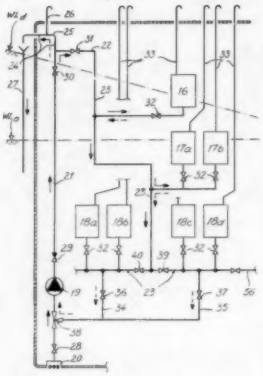
1. A grid system for supporting a plurality of items of equipment from a deck of a floating vessel, comprising:
a plurality of bracket means, welded to said deck;
a support grid means for supporting said plurality of items of equipment above said deck, said support grid means including a plurality of interconnected substantially horizontally oriented beams;
a plurality of detachable connecting means for detachably connecting said support grid means to said plurality of bracket means, so that said support grid means can be attached to said plurality of bracket means without the need for welding to said deck after said plurality of bracket means has previously been welded to said deck, at least one of said detachable connecting means being associated with each one of said bracket means; and
equipment mounting means, operably associated with said support grid means, for mounting said plurality of items of equipment above said support grid means.

4,715,309
DEVICE FOR THE HANDLING OF LIQUIDS

Lars-Olof Liberg, Kungälv, Sweden, assignor to Götaverken Arendal AB, Göteborg, Sweden

Filed Dec. 30, 1985, Ser. No. 814,770
Claims priority, application Sweden, Jan. 21, 1985, 8500263
Int. Cl.[4] B63B 43/06
U.S. Cl. 114—125 **8 Claims**

1. A ballast handling system for a seaborne vessel, comprising a pump connected to at least one tank by conduitry comprising:
(A) means for connecting the suction side of the pump with the water surrounding the vessel;
(B) a riser conduit connected to the pressure side of said pump which extends to a first level above said tanks;
(C) a distribution conduit branched off from the riser conduit at said first level which leads to said at least one tank;
(D) an overflow pipe extending to a second level above the first level and having an outboard terminal above the maximum possible water level surrounding the vessel after serious damage to the vessel; and

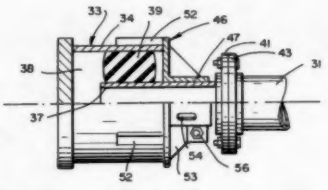


(E) a first shut-off valve in said riser conduit and a second shut-ff valve in said distribution conduit which isolate, when closed, the overflow pipe from the remainder of the conduitry;
(F) wherein the conduitry is dimensioned so that the pressure required to raise liquid to said first level substantially corresponds to the pressure required, in normal use, to cover losses of flow in the distribution conduit.

4,715,310
MARINE SHOCK ABSORBING APPARATUS WITH STABILIZERS

Walter B. Curtis, Thibadaux; Gregory L. Davis, and Mark C. Klimowicz, both of Morgan City, all of La., assignors to Texaco Inc., White Plains

Filed Jul. 19, 1985, Ser. No. 756,543
Int. Cl.[4] B63B 59/02
U.S. Cl. 114—220 **6 Claims**



1. In a shock absorbing marine bumper for a structure positioned in a body of water, said structure including; a support member (13) which extends beneath the water's surface,
a foundation member (21) depending outwardly from said support member,
an elongated king post (26) having opposed upper and lower ends, and disposed substantially uprightly in the body of water to contact a vessel floating adjacent to the structure, said king post lower end being supportably engaged with said foundation member (21),
a resiliently compressible shock absorber (33) including a casing (34) which depends outwardly from said support

member (13), having a retractably mounted pipe (37) which protrudes axially from the casing to engage the king post upper end, whereby displacement of said king post by a floating vessel will cause said pipe (37) to retract into said shock absorber casing (34) while resisting said king post movement, the improvement therein for provisionally obviating the shock absorbing action of said shock absorber (33) which comprises

a stabilizer including a collar (47) which is removably fixed to the portion of said pipe (37) which protrudes axially from said casing (34), and at least one contact member (51) which extends outwardly from said collar (47) to engage said casing (34) thereby precluding further axial movement of said pipe (37) relative to said casing (34).

4,715,311

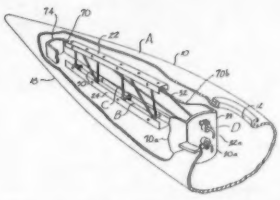
VARIABLE VOLUME KAYAK HULL

William E. Masters, P.O. Box 686, Liberty, S.C. 29657

Continuation of Ser. No. 766,567, Aug. 19, 1985, abandoned. This application Apr. 6, 1987, Ser. No. 33,850

Int. Cl.⁴ B63B *35/72*

U.S. Cl. 114—347 **21 Claims**



1. A kayak having a hull constructed from a flexible material with a central seat section, enclosed bow and stern hull sections having prescribed enclosed volumes on respective sides of said central seat section, said kayak comprising:

means connected to opposed generally horizontal interior surfaces of one of said hull sections for deforming the hull cross-sectional configuration inwardly along an appreciable length thereof to change the volume of said one hull section and adjust the volume of said one hull section to the weight of a boater so that said one hull section may be submerged by the weight of said boater under water about its entire circumference along a portion of its length for performing water acrobatics.

4,715,312

CONVERTIBLE CRAFT

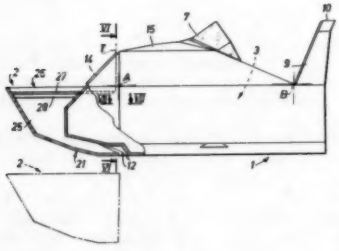
Francois Bouvart, 2, avenue de Compiègne, 60300 Senlis, France

Filed Aug. 6, 1986, Ser. No. 893,691

Claims priority, application France, Aug. 9, 1985, 85 12254

Int. Cl.⁴ B63B *7/04*

U.S. Cl. 114—352 **12 Claims**



1. A craft having an aft part and a foward end part comprising:

a hull including said aft part and having a forward part, said hull being capable of floating on water, said aft part including a first hollow space suitable as a navigation cabin;

a stem, said stem being said forward end part of said craft when said stem is attached along a joint to said foward part of said hull, and being adapted for positioning above said first space to at least in part enclose said first space after complete detachment of said stem from said forward part of said hull, said stem when attached at said forward part of said hull enclosing a second hollow space between said hull and stem, and further comprising communication means between said second space and the exterior of said craft, said communication means being positioned such that water entering said hollow space naturally drains to the exterior of said craft whenever the level of water within said second hollow space exceeds the level of water surrounding said craft.

4,715,313

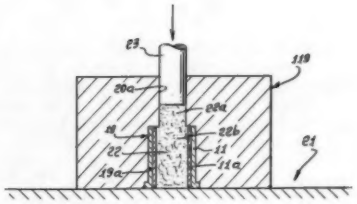
PUMP LINERS AND A METHOD OF CLADDING THE SAME

Gunes M. Ecer, Irvine, Calif., assignor to CDP, Ltd., Newport Beach, Calif.

Continuation of Ser. No. 769,313, Aug. 26, 1985, abandoned, which is a division of Ser. No. 689,312, Jan. 7, 1985, Pat. No. 4,603,062. This application Jun. 16, 1986, Ser. No. 874,607

Int. Cl.⁴ B05C *11/02*

U.S. Cl. 118—105 **6 Claims**



1. Apparatus for cladding an internal cavity surface of a metal object, the cladding consisting essentially of a powder metal layer on said internal surface, the metal powder including metal oxide or oxides, borides and carbides, said apparatus comprising

(a) a pressure transmitting and flowable grain filled into said cavity to contact said layer,

(b) means for pressurizing said grain to cause sufficient pressure transmission to the powder metal layer to consolidate same, said means transmitting force to the grain along a primary axis, said layer extending about said axis and spaced therefrom, whereby force is transmitted by the grain away from said axis and against said layer,

(c) and including a step die having a first chamber receiving said object, the die having a second chamber containing said grain communicating with said grain in the cavity which is in the first chamber, said pressurizing of the grain in the cavity being effected by grain pressurized in the second chamber,

(d) and wherein the second chamber is in axial alignment with the first chamber, the second chamber having a cross section less than the cross section of the first chamber, and said powder metal layer to be pressurized being everywhere outside the projection into said cavity of a throat defined by the second chamber, whereby pressure is transmitted from the grain in the second chamber which is everywhere spaced from said layer,

(e) the first chamber filled by the grain, radially inwardly of said layer.

4,715,314

ELECTROSTATIC POWDER COATING INSTALLATION

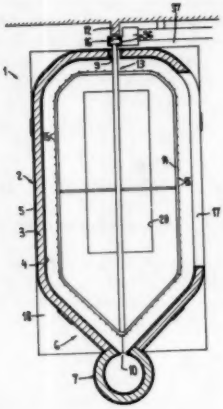
Hans-Ulrich Ramseier, and Fritz Brechbühler, both of Münsingen, Switzerland, assignors to H. U. Ramseier, Rubigen, Switzerland

Filed Apr. 25, 1986, Ser. No. 855,726

Claims priority, application Switzerland, Apr. 30, 1985, 1834/85

Int. Cl.[4] B05B 5/02

U.S. Cl. 118—631 19 Claims



1. An installation for applying an electrostatic powder coating of different colors to workpieces, comprising:

a cabin having longitudinally extending side walls, end walls and a bottom portion, each of said end walls having an opening for passage of workpieces into said cabin, an interior side of said walls and bottom portion being formed of a relatively non-stick, electrically non-conductive material and formed to be essentially free of any powder trapping discontinuities, said bottom portion comprising a smoothly varying generally V-shaped transition region extending longitudinally along the cabin;

a collecting channel having a variable width opening therein, said opening communicating with said transition region;

a suction device connected to said collecting channel, the width of said variable width opening being generally proportional to a distance of the opening from the suction device to obtain a generally uniform suction speed from the front to the back of the cabin whereby the amount of powder clinging to the walls of the cabin is reduced.

4,715,315

DISPENSER FOR PARTICULATE MATERIAL

Charles E. Burford, Dallas, Tex., assignor to Burford Corp., Maysville, Okla.

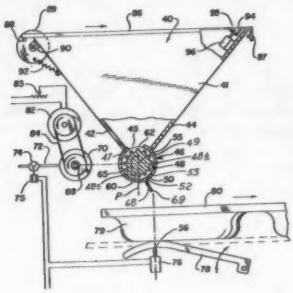
Continuation-in-part of Ser. No. 480,027, Mar. 27, 1983, Pat. No. 4,611,555. This application Nov. 7, 1985, Ser. No. 795,982

The portion of the term of this patent subsequent to Sep. 16, 2003, has been disclaimed.

Int. Cl.[4] B05C 11/00

U.S. Cl. 118—684 7 Claims

1. Apparatus to dispense either flaky or particulate material onto an article comprising: a container having an elongated opening formed therein; a dispensing tube having a hollow bore, said tube extending longitudinally of said opening, said tube having longitudinally extending inlet and outlet passages formed therein, said inlet passage communicating with the inside of the container and with the bore of the tube, said outlet passage communicating with the bore of the tube and the exterior of the container, wall segments on said dispensing tube extending between said inlet and outlet passages, one of said wall segments being longer than the other of said wall segments and said outlet passage lying entirely on one side of a vertical plane extending through the center of said dispensing tube such that the lower edge of one of said wall segments is positioned at a lower elevation than the lower edge of the other wall segment; a mandrel rotatably disposed in said bore; conveyor means on the surface of the mandrel for conveying the material from the container to the outlet of the bore, said conveyor means having a major diameter which is less than the diameter of the bore to form an annular space between the major diameter of the conveyor means on the mandrel and the



diameter of the bore which is greater than the maximum dimension of individual particles of material being dispensed to prevent destruction of the particles being dispensed but being spaced sufficiently close together to prevent gravity flow of particles through the annular space when the mandrel is not rotating; drive means drivingly connected to said mandrel; and means associated with said drive means to intermittently energize said drive means when an article to receive particulate material is positioned in a predetermined relationship relative to said tube and to de-energize said drive means when the article is moved away from said predetermined position.

4,715,316

APPARATUS FOR PLATING AND COATING

Donald J. Broomfield, Elgin, Ill.; Paul C. Briggs, North Andover, Mass.; Eric G. Parker, Algonquin, and David P. Wagner, Geneva, both of Ill., assignors to Illinois Tool Works Inc., Chicago, Ill.

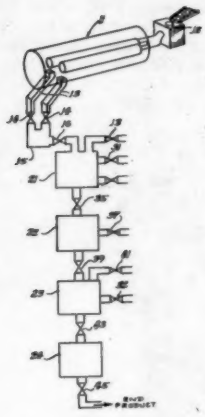
Division of Ser. No. 712,597, Mar. 18, 1985, Pat. No. 4,600,662. This application Apr. 11, 1986, Ser. No. 850,517

Int. Cl.[4] C23C 16/00

U.S. Cl. 118—716 5 Claims

1. An apparatus for producing a coated article comprising a first vacuum chamber for applying a layer of non-oxidized metal plating material to the article while maintaining the plated article in an atmosphere preventing oxidation of the plating material and a second vacuum chamber adjacent said first vacuum chamber for applying a layer of a coating material

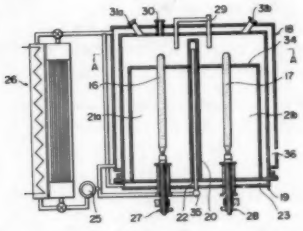
in liquid form to said plating material while maintaining the plated articles in an inert atmosphere, and means for preventing said coating material from entering said first vacuum chamber.



4,715,317
METHOD FOR PRODUCING OF POLYCRYSTALLINE SILICON AND APPARATUS THEREOF

Hiroshi Ishizuka, 19-2, Ebara 6-chome, Shinagawa-ku, Tokyo, Japan

Filed Oct. 15, 1985, Ser. No. 767,079
Claims priority, application Japan, Oct. 24, 1984, 59-223177
Int. Cl.[4] C23C *16/24*
U.S. Cl. 118—719 1 Claim

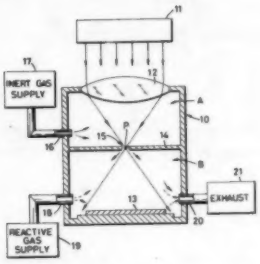


1. An apparatus for production of polycrystalline silicon, comprising: a reaction vessel of metallic material closed with a detachable lid, a deposition substrate of electrically conductive material comprising a plurality of portions extending axially from the lid, an inlet for introducing reactant gas into said vessel, an outlet for removing reactant gas from said vessel, a jacket arranged over a substantial part of said vessel providing an interspace between the jacket and vessel, a hollow partition comprising several wings, said wings each having an inner cavity and being arranged to extend radially between and to separate two adjacent vertical portions of the deposition substrate, said cavity having inner tubes through which cooling medium is allowed to flow, a closed circuit for circulating a gas, said circuit being filled with gas and including said interspace and said partition cavities, and a two-way temperature controlling means in communication with said interspace and partition cavities, said temperature controlling means being capable of heating and cooling said gas and being capable of keeping the vessel wall in the temperature range of about 100° to 450° C., while simultaneously maintaining a temperature difference of about 100° to 700° C. between said vessel wall and said substrate.

4,715,318
PHOTOCHEMICAL REACTION APPARATUS

Masaomi Kameyama, and Koichi Matsumoto, both of Tokyo, Japan, assignors to Nippon Kogaku K.K., Tokyo, Japan

Filed Jan. 16, 1986, Ser. No. 819,801
Claims priority, application Japan, Jan. 17, 1985, 60-4991; Apr. 16, 1985, 60-79362; Jun. 7, 1985, 60-122791
Int. Cl.[4] H01L *21/205, 21/263*
U.S. Cl. 118—722 15 Claims



1. An apparatus for processing an element, such as a silicon wafer, by the use of photochemical reaction comprising:

light source means for supplying a light energy;

a housing forming therein a reaction chamber in which said element is arranged, said housing including wall means defining said reaction chamber, said wall means including at least one opening formed therethrough, said element being arranged spatially apart from said opening;

condensing means arranged between said light source means and said reaction chamber and spatially apart from said wall means whereby said light energy is condensed at around said opening and introduced into said reaction chamber; and

means for supplying a gas which is photochemically reactive to said light energy into said reaction chamber.

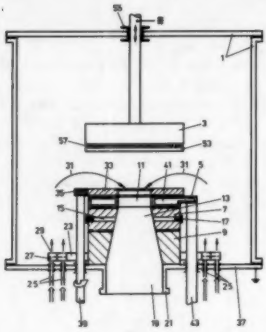
4,715,319
DEVICE FOR COATING A SUBSTRATE BY MEANS OF PLASMA-CVD OR CATHODE SPUTTERING

Udo Bringmann; Klaus Drews, and Detlef Schön, all of Halstenbek, Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Division of Ser. No. 694,725, Jan. 25, 1985, Pat. No. 4,673,588. This application Feb. 27, 1987, Ser. No. 20,067
Claims priority, application Fed. Rep. of Germany, Jan. 28, 1984, 3402971
Int. Cl.[4] C23C *16/00*
U.S. Cl. 118—723 24 Claims

1. A device for providing a coating on a substrate by means of a plasma chemical vapor deposition or cathode sputtering, said device comprising a first angular electrode provided with an aperture extending along a central axis and axially fixed in an evacuatable chamber provided with a second counter sheet electrode spaced from and opposing said first electrode, means for introducing gaseous substances into said chamber, means for applying a voltage to said electrodes to produce plasma in said chamber, and said chamber being further provided with a bipartite insulator block having an upper first portion adjoining said first electrode and provided with a central aperture corresponding to the central aperture of said first electrode and having a second portion immediately adjoining said first por-

tion bearing on the base of said evacuatable chamber and positioned over a conduit means for conducting gaseous material from said chamber to a vacuum pump means, said conduit means extending into the base of said evacuatable chamber.

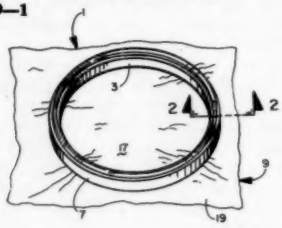


4,715,320

SANITARY DEVICE FOR ANIMALS

William D. Barnhart, 629 Ranson St., Ripon, Wis. 54971

Filed Jun. 9, 1986, Ser. No. 871,927
Int. Cl.[4] A47K *11/02*
U.S. Cl. 119—1 **12 Claims**



1. Apparatus for creating a sanitary receptacle comprising:

a. an inner member formed into a closed circular hoop having a generally rectangular cross section, a predetermined outer diameter, a predetermined wall thickness, and a predetermined length, the inner hoop being made of a sanitary plastic material;

b. a plastic center member formed into a closed circular hoop concentric with the inner member and having a predetermined inner diameter that is about 0.25 inches greater than the outer diameter of the inner hoop to create a generally uniform first annular space between the inner hoop outer diameter and the center hoop inner diameter, the center member having a generally rectangular cross section, predetermined outer diameter and a predetermined length; and

c. a plastic outer member formed into a closed circular hoop concentric with the inner and center members and having an inner diameter about 0.25 inches greater than the outer diameter of the center member to create a generally uniform second annular space between the center member outer diameter and the outer member inner diameter, the outer member having a generally rectangular cross section, predetermined length, and wall thickness,

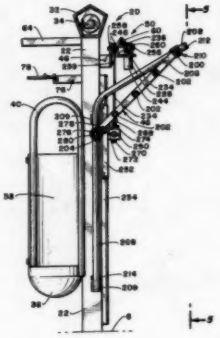
so that the three concentric members may cooperate to loosely retain a sheet of thin flexible material spanning the area of the outer member and folded into the first and second annular spaces between the respective inner, center, and outer members.

4,715,321

MILKING PARLOR STALL CONSTRUCTION WITH OVERHEAD GATES

August Vandenberg, 1904 Trotter Trail, Norco, Calif. 91760; Ben W. Vandenberg, 17224 Gard Ave., Artesia, Calif. 90701; Andrew W. Vandenberg, 15751 Ryon St., and Ben E. Haws, 8828 Laurel St., both of Bellflower, Calif. 90706

Filed Jul. 25, 1986, Ser. No. 889,515
Int. Cl.[4] A01K *1/12*
U.S. Cl. 119—14.03 **22 Claims**



1. A milking parlor construction comprising in combination:

(a) a module comprising at least two spaced-apart, hollow vertical upright members adapted for rigid securement in a base or the like;

(b) a feed bowl means secured to each said hollow vertical upright member and defining a cattle feeding station;

(c) a feed conveyor means superpositioned in stationary position to said hollow vertical upright members and adapted to deliver feed to said hollow vertical upright members defining a feed passageway having communication to said feed bowl means;

(d) at least two pivoted gate members vertically upraisable and mounted on each said hollow vertical upright member and being adapted to move vertically and pivotally between an upper open and a lower closed position; and

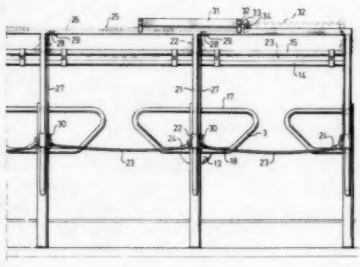
(e) means to move at least pairs of said gate members into a selected one of the open and closed positions.

4,715,322

METHOD AND MEANS FOR KEEPING CATTLE IN A STALL BARN

Kjell Johansson, Ökne Gård 1011, S-660 30 Värmlands Nysäter, Sweden

Filed Jul. 3, 1986, Ser. No. 881,932
Int. Cl.[4] A01K *29/00*
U.S. Cl. 119—27 **12 Claims**



1. An arrangement for keeping cattle in a stall barn having

feeding and resting places, wherein each animal is maintained, during feeding and resting, in a separate stall defined by at least vertical parallel side stall partitions, said animals being divided into a plurality of individual groups having a predetermined number of animals in each group, the groups being distributed along said feeding and resting places, the arrangement comprising closing means for confining the animals in individual stalls, a plurality of gates and power transmission means for said gates for establishing predetermined routes of a way system for the animals to and from a specific collecting place at a distance from said feeding and resting places, said closing means being at the rear of the stalls behind each animal within each group and being adapted to be raised and lowered simultaneously by an individual power transmision means, and a common control station having control means for automatically controlling the power transmission means for said gates and said closing means, said control means being effective to actuate the power transmission means for the closing means in a predetermined sequence, depending on the group of animals selected, and at the same time actuating the power transmission means for the gates to establish a predetermined route of said way system for the group selected, said closing means for each stall comprising a flexible barrier operatively connected at the rear of said stalls and having a length greater than the distance between connecting points of said barrier to the vertical side stall partitions, said barrier being connected at the rear of the stalls by having its opposed ends connected to sleeves slidable along guide means comprising vertical bars mounted at the rear end of said side stall partitions, said bars for a group of animals supporting a common horizontal groove element having a pull rod movably mounted therein, said pull rod being operatively connected to each sleeve and mounted for longitudinal movement in said grooved element for raising and lowering the barrier for each stall under control of said individual power transmission means, whereby said arrangement is free of pivotally journalled means for raising and lowering the barriers.

4,715,323

APPARATUS FOR SUPPLYING FOOD TO A PLURALITY OF CAGES

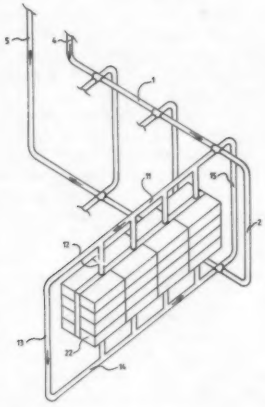
Teus Malestein, Stationsweg 49, 3771 VC Barneveld, Netherlands

Filed Oct. 10, 1985, Ser. No. 786,083

Claims priority, application Netherlands, Oct. 16, 1984, 8403159; Oct. 16, 1984, 8403160

Int. Cl.[4] A01K *5/02, 39/01*

U.S. Cl. 119—52 AF **12 Claims**



1. Apparatus for supplying food to a plurality of cages arranged in rows beside each other, said apparatus comprising a horizontally extending food gutter for each of said rows and means for supplying food to the said gutters, said gutters being provided with horizontal food transport means for tansporting food therealong and said food supplying means comprising a plurality of substantially vertical food supply pipes horizontally spaced along the length of each gutter which debouch into that gutter.

4,715,324

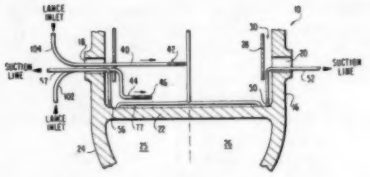
NUCLEAR STEAM GENERATOR SLUDGE LANCING METHOD AND APPARATUS

Gary R. Muller; Scott M. Theiss; James E. Brown, Jr., all of Palm Harbor, and Bobby R. Lawson, Tarpon Springs, all of Fla., assignors to Apex Technologies, Inc., Stuart, Fla.

Filed Nov. 26, 1985, Ser. No. 801,730

Int. Cl.[4] F22B *37/52, 37/54*

U.S. Cl. 122—381 **16 Claims**



1. A method of removing sludge from a steam generator of the type comprising an inner vertically oriented U-shaped bundle of heat transfer tubes having their open ends in fluid communication with holes in a tube sheet extending horizontally across the lower portion of a generally cylindrical outer shell of the generator, a central tube lane being defined between the legs of the U and extending beween two diametrically opposite hand holes in the outer shell, and a peripheral lane being defined between the tube bundle and the outer shell of the generator, said method comprising the steps of:

inserting in a first of said hand holes a first movable fluid lance carrying on the inner end thereof a plurality of first nozzles which emit a plurality of high pressure high volume fluid jets when said lance is activated;

activating said lance and moving it inwardly along said tube lane to dislodge sludge deposited on said tube sheet and around said tubes;

inserting in said first hand hole a second movable fluid lance carrying on the inner end thereof a plurality of second nozzles which emit a plurality of low pressure high volume fluid jets upon activation of said second lance;

activating said second lance while said first lance is activated, after said first lance has moved inwardly a preselected distance, to dislodge sludge, to form a water barrier against redeposition of dislodged sludge and, together with the flow from said first lance, to suspend dislodged sludge particles in a volume of water flowing toward said peripheral lane; and removing, by suction, the fluid-entrained sludge flowing in said peripheral lane.

4,715,325

POLLUTION CONTROL THROUGH FUEL TREATMENT

Claud W. Walker, Rte. 2, Box 201, Portales, N. Mex. 88130

Filed Jun. 19, 1986, Ser. No. 876,226

Int. Cl.[4] F02B *75/12*

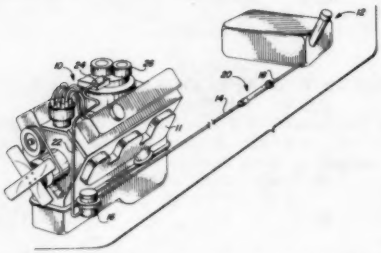
U.S. Cl. 123—1 A **18 Claims**

1. Method of operating an internal combustion engine comprising the steps of:

placing a housing in series relationship respective to fuel flow to said engine so that the fuel flows through the housing;

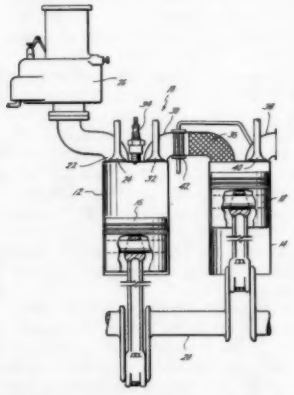
encapsulating at least one alloy member within said housing so that the fuel flowing through the housing is brought into contact with the surface of the alloy;

said alloy member consists of a mixture of the following metals: copper, zinc, nickel, lead, and tin;
said mixture has the following range of composition:



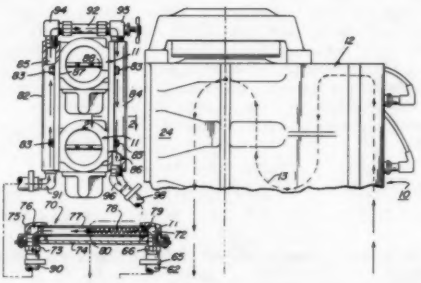
copper 40–66%; zinc 2–28%; nickel 5–25%; lead 2–12%; and tin 1–5%.

4,715,326
MULTICYLINDER CATALYTIC ENGINE
Robert H. Thring, San Antonio, Tex., assignor to Southwest Research Institute, San Antonio, Tex.
Filed Sep. 8, 1986, Ser. No. 905,003
Int. Cl.[4] F02B *43/08*
U.S. Cl. 123—3 **8 Claims**



1. A multicylinder catalyst engine comprising,
a first cylinder and a first piston reciprocating therein,
a second cylinder and a second piston reciprocating therein,
said first cylinder including an intake port,
an intake valve in the intake port admitting all of the air and fuel for the engine,
air/fuel mixing means connected to the intake port,
said intake valve being opened as the first piston draws an air/fuel mixture into the first cylinder, and said intake valve being closed as the first piston moves to compress the mixture,
a transfer passageway in communication between the first and second cylinders,
a transfer valve in the passageway adjacent the first cylinder closing while the air/fuel mixture is drawn into the first cylinder and opening when the mixture in the first cylinder is compressed for transferring the compressed mixture from the first cylinder toward the second cylinder,
a catalyst positioned in the passageway downstream of the transfer valve for igniting the compressed mixture when the transfer valve is closed thereby powering the second piston,
an exhaust port connected to the second cylinder, and
an exhaust valve positioned in the exhaust port for exhausting gas from the second cylinder.

4,715,327
FLOW SYSTEM FOR ENGINE-PUMP ASSEMBLY
H. Alfred Eberhardt, Paoli, Pa., assignor to Hale Fire Pump Company, Conshohocken, Pa.
Filed May 23, 1986, Ser. No. 866,384
Int. Cl.[4] F02P *5/14, 11/14*
U.S. Cl. 123—41.15 **12 Claims**



1. A flow system for an engine-pump assembly having an engine including carburetor means and a cooling system including a cooling water flow path having an inlet and an outlet, and a pump mounted adjacent said engine and including a pump inlet having a water supplied thereto and a pump discharge passage delivering water at a high pressure comprising:
first flow conduit means for delivering water at said high pump pressure from the discharge passage of said pump to the inlet of the cooling water flow path of the engine cooling system,
second conduit means for delivering water from the outlet of the cooling water flow path of the engine cooling system to the inlet side of said pump, and
a heat exchanger means contained in said second conduit means for applying the heat within said water discharged from said engine cooling system to the engine carburetor means, including a pair of heat exchanger blocks each of which is mounted on a side portion of said carburetor means in good heat conducting contact with said carburetor means,
one of said conduit means including a flow indicator comprising a transparent flow tube through which said water flows in the direction from an inlet end to an outlet end thereof, a coil spring having one end secured at said tube inlet end and a free end contained within said flow tube, and an indicator member captured within said free end of said spring, said water flow through said flow tube applying the outlet end of said tube to a position indicative of the rate of cooling water flow.

4,715,328

MULTIPLE PISTON EXPANSION CHAMBER ENGINE

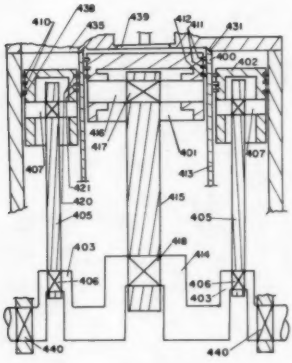
Francis W. Jackson, 409 Penwyn Rd., Wynnewood, Pa. 19096

Continuation-in-part of Ser. No. 727,338, Apr. 25, 1985, abandoned, and Ser. No. 688,954, Dec. 31, 1984, Pat. No. 4,570,580, and Ser. No. 647,842, Sep. 6, 1984, Pat. No. 4,580,532, which is a division of Ser. No. 326,902, Dec. 2, 1981, Pat. No. 4,489,681, said Ser. No. 688,954, Continuation-in-part of Ser. No. 326,902, and Ser. No. 647,842, is a division of Ser. No. 326,902, said Ser. No. 727,338, is a division of Ser. No. 647,842, which is a division of Ser. No. 326,902. This application Oct. 15, 1985, Ser. No. 787,493

The portion of the term of this patent subsequent to Apr. 8, 2003, has been disclaimed.

Int. Cl.[4] F02B *75/18*

U.S. Cl. 123—52 B 4 Claims



1. An internal combustion engine wherein combustion, expansion and exhaust functions are performed in a cylinder comprised of an auxiliary piston reciprocating in the cylinder, a sleeve valve reciprocating within said auxiliary piston, a working piston reciprocating within said sleeve valve and leading said auxiliary piston, an auxiliary chamber above said auxiliary piston and a combustion chamber above said working piston; said sleeve valve controlling communication of said auxiliary chamber with said combustion chamber to prevent communication of combusted products from the chamber above said working piston to the chamber above said auxiliary piston from when the working piston is at about TDC until a subsequent expansion stroke of said working piston is underway and at a point between 30 and 160 degrees past TDC and with said auxiliary piston being at about TDC at this same instant when said working piston is at said point and said communication then is commenced; and to permit communication only during said expansion stroke continuing past said point and a following exhaust stroke of said working piston so as to utilize energy of expansion from said auxiliary piston as it expands until said working piston has passed through BDC and returns to about TDC during said exhaust stroke of said working piston.

4,715,329

INDUCTION SYSTEM FOR INTERNAL COMBUSTION ENGINE

Makoto Yasuda; Shuichi Nishimura, both of Yokohama, and Syonzabu Ura, Fujisawa, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Apr. 8, 1986, Ser. No. 849,401

Claims priority, application Japan, Apr. 9, 1985, 60-51649[U]

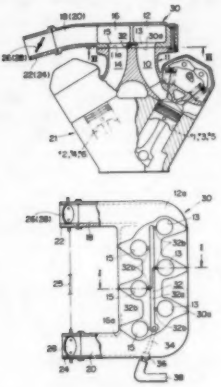
Int. Cl.[4] F02B *75/18*

U.S. Cl. 123—52 MV 5 Claims

1. An induction system for an internal combustion engine having a plurality of cylinders, comprising:

an intake manifold having a plurality of passages for supplying air to the cylinders and an upstream planar joining end face;

a collector unit located upstream of said intake manifold for supplying air to said passages of said intake manifold and having a planar joining end face which is joined with said planar joining end face of said intake manifold; and



a groove formed in at least one of said joining end faces to define therebetween a fluid recirculation passage and having a main groove section and a plurality of outlet groove sections branching off from said main groove section so that recirculation fluid is drawn in said main groove section and distributed from said outlet groove sections to said passages of said intake manifold, respectively.

4,715,330

ELECTROMAGNETICALLY-ACTUATED POSITIONING MECHANISM

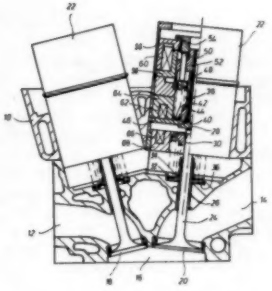
Josef Buchl, Rehsteig 12, 8071 Lenting, Fed. Rep. of Germany

Filed Apr. 11, 1986, Ser. No. 850,935

Claims priority, application Fed. Rep. of Germany, Apr. 12, 1985, 3513109

Int. Cl.[4] F01L *9/04*; H01F *7/08*

U.S. Cl. 123—90.11 5 Claims



1. Electromagnetically-actuated positioning mechanism for valve-type reciprocating actuators in displacement machines comprising in operative combination:

(a) means for reciprocatingly actuating a valve member, said reciprocating actuator means being movable between two discrete, mutually-opposite operating positions;

(b) said reciprocating actuator means having an electromagnetically attractable member and being disposed to move

said valve member from a first, closed operating position to a second, open operating position;
(c) said valve member being biased to said first closed position by at least one spring member;
(d) said reciprocating actuator means being biased toward said second open position by at least one spring member;
(e) a pair of electromagnetics disposed to selectively attract said electromagnetically attractable member to said first or said second operating position when energized;
(f) said spring members forming a spring system having a locus of equilibrium situated between said two operating positions;
(g) means for adjusting the locus of equilibrium of said spring system to shift said locus to a position different from either of said operating positions;
(h) said adjusting means comprises an electromagnetically-actuated member disposed to exert compressive force on at least one of said actuator spring members when energized to shift said spring system equilibrium locus as compared to the locus when said adjusting means electromagentically-actuated member is de-energized; and
(i) said valve member is at least partly open when said adjusting means is in its de-energized state.

4,715,331

ELECTROMAGNETICALLY-ACTUATED POSITIONING MECHANISMS

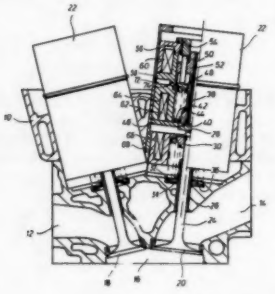
Peter Kreuter, Josef-Ponten Str. 38, Aachen 5100, Fed. Rep. of Germany

Filed Apr. 11, 1986, Ser. No. 850,936

Claims priority, application Fed. Rep. of Germany, Apr. 12, 1985, 3513106

Int. Cl.[4] F01L *9/04;* H01F *7/08*

U.S. Cl. 123—90.11 **20 Claims**



1. A solenoid insulation system for an electromagnetically-actuated positioning mechanism for a valve-type reciprocating actuator assembly for actuating a valve member in a displacement machine, comprising in operative combination:
(a) at least one adjustable spring disposed between and bearing on a first and a second spaced-apart seat member;
(b) at least one actuating solenoid having a core disposed to selectively attract a single guided ferromagnetic valve actuator member to a first operating position;
(c) said ferromagnetic valve actuator member being disposed across the face of said actuating solenoid and contactable with but disconnected from said valve member, and comprising said first spring seat member;
(d) said spring being disposed coaxial to said actuating solenoid in a bore provided therein and disposed in contact with said ferromagnetic valve actuating member on one side thereof to urge it toward contact with said valve member;
(e) at least one adjusting solenoid having a core disposed in association with said actuator assembly adapted to adjust the position of said second spring seat member; and
(f) said actuating solenoid core and said adjusting solenoid core are disposed with respect to each other to provide magnetic resistance therebetween to substantially decouple the respective cores of said solenoids.

4,715,332

ELECTROMAGNETICALLY-ACTUATED POSITIONING SYSTEM

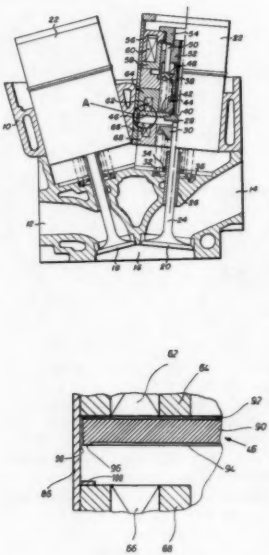
Peter Kreuter, Josef-Ponten Str. 38, 5100 Aachen, Fed. Rep. of Germany

Filed Apr. 11, 1986, Ser. No. 850,939

Claims priority, application Fed. Rep. of Germany, Apr. 12, 1985, 3513103

Int. Cl.[4] F01L *9/04;* H01F *7/08*

U.S. Cl. 123—90.11 **20 Claims**



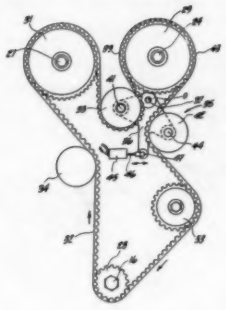
1. Apparatus for improved control of release of an actuator anchor plate in an electromagnetically-actuated positioning mechanism for a valve-type reciprocating actuator assembly in a displacement machine, comprising in operative combination:
(a) at least one actuating solenoid having a core with a contact face disposed to selectively attract a ferromagnetic valve actuator assembly anchor plate to a first operating position;
(b) a ferromagnetic actuator assembly anchor plate having a contact face corresponding to and opposed from said solenoid contact face, and said anchor plate is disposed to be magnetically attractable to and releasable from said solenoid core, said anchor plate extending substantially entirely across said core face; and
(c) said actuating solenoid core and said anchor plate are disposed with respect to each other to provide therebetween magnetic resistance in the magnetic circuit set up by the magnetic flux of said core, said magnetic resistance extending substantially across said contact faces and being sufficient to reduce generation and propagation of eddy currents in said anchor plate resulting in rapid magnetic field decay upon cut-off of current to said actuating solenoid coil, thereby reducing the release time of said anchor plate from said actuating solenoid.

4,715,333

VALVE TIMING CONTROL MEANS FOR ENGINE

Takeshi Oyaizu, Kakegawa, Japan, assignor to Yamaha Hatsudoki Kabushiki Kaisha, Japan

Division of Ser. No. 783,005, Oct. 2, 1985, Pat. No. 4,685,429.
This application May 26, 1987, Ser. No. 54,236
Claims priority, application Japan, May 14, 1985, 60-100524
Int. Cl.[4] F01L 1/26
U.S. Cl. 123—90.31 6 Claims



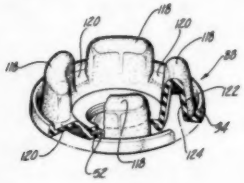
1. In a double overhead camshaft drive arrangement comprising a cylinder head, first and second camshafts journaled by said cylinder head, first and second driven pulleys each affixed for rotation about first and second parallel axes with a respective one of said camshafts, a drive pulley affixed for rotation with a drive shaft about a third axis parallel to said first and second axes to define with said first and second axes the apicies of a triangle, flexible transmitter means trained around said pulleys for driving said camshafts from said drive shaft, the improvement comprising an idler pulley disposed between said driven pulleys and rotatable about a fourth axis lying without the triangle, said flexible transmitter means passing over one of said driven pulleys then across said idler pulley and finally over the other of said driven pulleys and engaging substantially more than 180 degrees of the circumference of each of said driven pulleys and of said idler pulley.

4,715,334

SELF CONTAINED HYDRAULIC BUCKET LIFTER

Stephen M. Buente, and George A. Hillebrand, both of Battle Creek, Mich., assignors to Eaton Corporation, Cleveland, Ohio

Continuation of Ser. No. 559,127, Dec. 7, 1983, abandoned. This application May 16, 1986, Ser. No. 864,561
The portion of the term of this patent subsequent to Aug. 25, 2004, has been disclaimed.
Int. Cl.[4] F02L 1/24
U.S. Cl. 123—90.58 18 Claims



1. A self-contained hydraulic lash adjuster for use in the valve gear of an internal combustion engine, said tappet comprising:

(a) body means including structure defining,

(i) an outer annular wall having the outer periphery thereof forming a wear resistance surface;

(ii) a transversely extending end wall substantially closing one end of said outer wall and defining an outwardly exposed cam face surface, and

(iii) an annular hub disposed within said outer wall and spaced therefrom;

(b) hydraulic lash adjusting means moveably received within said hub, said lash adjusting means including structure defining a reaction surface adapted for contacting associated components of the engine valve gear, said reaction surface extending generally parallel to said cam face surface and being moveable with respect thereto, said lash adjusting means including means defining a fluid pressure chamber and one-way valve means operable to admit fluid to said chamber for altering and hydraulically holding the position of said reaction surface with respect to said cam face surface for lash adjustment in said valve gear, said lash adjusting means further including means biasing said surface away from said cam face reaction surface; and

(c) seal means extending generally transversely within said outer annular wall and operative to define in combination with said body means an expansible closed fluid reservoir for communication with said fluid pressure chamber, characterized in that said seal means includes:

(i) a generally annular compliant diaphragm with an outer circumferential portion thereof carried within said body means and forming a fluid-tight seal therebetween; and,

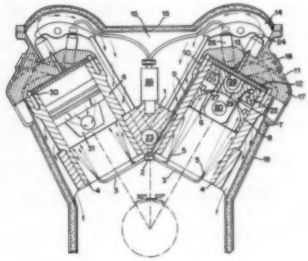
(ii) a rigid cap member having a plurality of spaced apertures therethrough with an inner circumferential portion of said diaphragm molded over the periphery of said cap member with said diaphragm material received in said apertures for providing positive engagement of said diaphragm with said cap member to provide a seal therebetween and to accommodate movement of said lash adjusting means upon installation of the tappet in the valve gear of an engine, said cap member operative to transmit forces in the valve train from said reaction surface.

4,715,335

INTERNAL COMBUSTION ENGINE WITH REDUCED NOISE AND HEAT EMISSIONS

Ludwig Elsbett; Günter Elsbett, and Klaus Elsbett, all of Industriestrasse 14, D-8543 Hilpoltstein, Fed. Rep. of Germany

Filed Mar. 12, 1985, Ser. No. 710,864
Claims priority, application Fed. Rep. of Germany, Mar. 13, 1984, 3409101
Int. Cl.[4] F01P 3/10, 3/20
U.S. Cl. 123—41.35 18 Claims



1. An oil cooled reciprocating internal combustion engine, comprising a crankshaft; a plurality of free standing cylinders extending upwardly from said crankshaft and each having an internal surface and an external surface; means for at least substantially uniformly cooling said internal and external surfaces at least substantially exclusively by oil, including means for supplying oil to said cylinders and means for directing such

oil against the major portions at least of the internal and external surfaces of said cylinders; and means defining a common chamber for said cylinders which contributes to uniformity of distribution of temperatures along the peripheries of the cylinders.

4,715,336

FOUR-STROKE INTERNAL COMBUSTION PISTON ENGINE

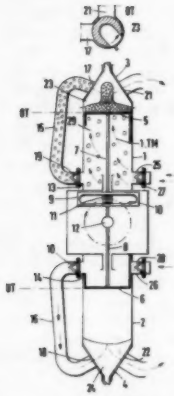
Manfred Schindler, Markt Schwaben, and Reinhold Ficht, Munich, both of Fed. Rep. of Germany, assignors to Ficht GmbH

Filed Feb. 26, 1986, Ser. No. 833,814

Claims priority, application Fed. Rep. of Germany, Feb. 28, 1985, 3507108

Int. Cl.[4] F02B *75/24*

U.S. Cl. 123—56 BC **4 Claims**



1. Four-stroke internal combustion piston engine comprising a crankshaft housing, a crankshaft located within said housing, at least two axially extending cylinders each located on an opposite side of said housing from one another and extending axially outwardly from said housing, each said cylinder having an inner end adjacent said housing and an outer end spaced axially outwardly from said housing, a piston located within each said cylinder and arranged to reciprocate in the axial direction of said cylinder between the inner and outer ends thereof, said pistons arranged to operate with a 180° phase shift, an axially extending piston rod for each said piston connected at one end to said piston and at the other end to said crankshaft, each said piston having a bottom dead center adjacent the inner end of said cylinder and a top dead center adjacent the outer end of said cylinder, each said cylinder having a variable volume inner cylinder space located between said piston and the inner end of said cylinder and a variable volume outer cylinder space located between said piston and the outer end of said cylinder, a suction system associated with said cylinders for supplying one of fresh air and a fuel-air mixture into said inner cylinder space, said suction system including means for transferring the one of fresh air and fuel-air mixture from said inner cylinder space to said outer cylinder space of said cylinder so that said piston moving toward said outer end draws the one of fresh air and fuel-air mixture into said inner cylinder space while the other said piston moves toward the inner end of the other said cylinder and displaces the one of fresh air and fuel-air mixture via said transfer means from said inner space for subsequent flow into said outer cylinder space forming a combustion chamber, wherein the improvement comprises that said suction system for supplying the one of fresh air and fuel-air mixture comprises a separate suction system section for supplying the one of fresh air and fuel-air mixture into each of said cylinders, said transfer means in each said supply system section comprises a transfer channel located exteriorly of said cylinder and connected at one end adjacent the inner end of said cylinder and at an opposite end above the cylinder adjacent the outer end of said cylinder, a transfer check valve located in said transfer channel at the inner end of said cylinder, and a suction stub located at the inner end of said cylinder spaced from said transfer channel and including an inflow check valve, said outer end of each cylinder has an outlet therein spaced from an inlet from said transfer channel into the outer end of said cylinder, a rotary slide valve located within the outer end of each said cylinder for controlling inflow from said transfer channel and flow through said outlet.

4,715,337

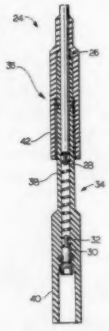
ENGINE IGNITION SYSTEM WITH AN INSULATED AND EXTENDABLE EXTENDER

Phillip B. Bohl, Chillicothe; Rodney J. Gillette, Peoria, and James C. Smith, Washington, all of Ill., assignors to Caterpillar Inc., Peoria, Ill.

Filed Jan. 31, 1985, Ser. No. 696,822

Int. Cl.[4] F02P *15/00*

U.S. Cl. 123—169 PA **21 Claims**



1. An insulated ignition extender adapted for use in an engine to connect between an igniter and a source of high energy, comprising:

a first electrically conducting core adapted to contact one of the igniter and the source of high energy;

a second electrically conducting core adapted to contact the other of the igniter and the source of high energy;

one of said cores being axially movable with respect to the other core to provide a variable length extender;

means for axially biasing apart the first and second electrically conducting cores and for providing a connection between the first and second electrically conducting cores so that electrical energy passes therethrough; and

a first outer tubular insulating member fixedly attached to and surrounding at least a portion of one of the first and second electrically conducting cores surrounding the biasing and providing means and slidably surrounding at least a portion of the other of the first and second electrically conducting cores.

4,715,338

ROTARY ENGINE

Raymond F. Pasquan, 131 Parker St., Sarnia, Ontario, N7T 6E9, Canada

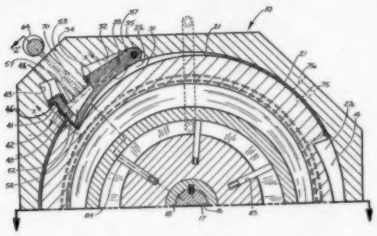
Filed Dec. 30, 1986, Ser. No. 947,890

Int. Cl.[4] F02B *53/00*

U.S. Cl. 123—248 **18 Claims**

1. In a rotary internal combustion engine of the type including a housing having a generally continuous inner circumferential surface, and a pair of opposed inwardly extending side walls, a rotor rotatably mounted within said housing and having an external generally peripheral surface in close proximity

to the inner circumferential surface of said housing and side edge surfaces adjacent said side walls, at least one power producing pocket in the outer peripheral surface of the rotor and extending thereacross, the pocket being defined in the direction of rotation of the rotor by a steep shoulder extending inwardly from the outer peripheral surface and a gradual sloping section returning to the outer peripheral surface and merging therewith, the improvement comprising a oscillating means mounted in an opening in said inner circumferential surface of said housing, said oscillating means including a

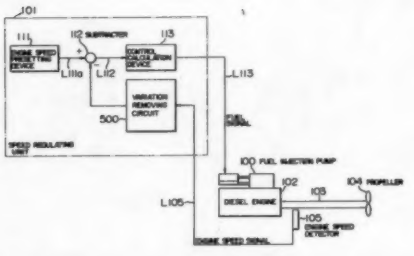


movable member having the width of said rotor and having a rotor engaging inner surface, said movable member having an outwardly open cavity formed therein and receiving a stationary piston member, said movable member and piston member defining an expandable combustion chamber within said member, said combustion chamber having an inlet valve for the admission of a pressurized combustible gas, an ignition means, and outlet means for communicating combustion gases developed in said combustion chamber into said power pocket to thereby produce a force between said oscillating means and said shoulder for driving said rotor.

4,715,339
GOVERNOR FOR INTERNAL COMBUSTION ENGINE

Ryuichi Sagawa; Osamu Nagata, and Hajime Yamada, all of Kobe, Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Japan

Filed Aug. 27, 1985, Ser. No. 769,891
Claims priority, application Japan, Sep. 1, 1984, 59-183521; Sep. 14, 1984, 59-193502
Int. Cl.[4] F02M *39/00*
U.S. Cl. 123—357 **10 Claims**



1. A governor for an internal combustion engine having a fuel pump comprising:

engine rotational speed detecting means for detecting a rotational speed of an engine and producing an engine rotational speed signal indicative of the engine rotational speed;

a variation removing circuit connected to receive the engine rotational speed signal from said detecting means and having means for removing from the engine rotational speed signal a periodical variation component due to pulsation of output torque generated by the engine itself prior to producing an averaged rotational speed signal and having a varying period corresponding to the variable rotational speed of the engine and a frequency

$$fc = Ns \cdot Z/60 \text{ Hz}$$

for a two stroke engine and

$$fc = Ns \cdot Z/120 \text{ Hz}$$

for a four stroke engine where

Ns=engine rpm

Z=number of cylinders;

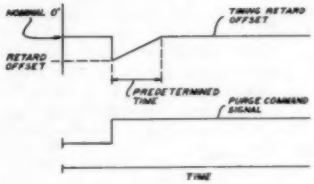
engine rotational speed presetting means for generating an engine rotating speed setting signal indicative of a desired engine rotational speed; and

means for calculating an amount of injected fuel to be supplied to the engine on the basis of the averaged rotational speed signal and speed setting signal from said variation removing circuit and said engine rotational speed presetting means, respectively, and for supplying a fuel signal indicative of the calculated amount of injected fuel to the injection pump for the engine.

4,715,340
REDUCTION OF HC EMISSIONS FOR VAPOR RECOVERY PURGE SYSTEMS

Jeffrey A. Cook, Dearborn, and Douglas R. Hamburg, Birmingham, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed May 4, 1987, Ser. No. 45,659
Int. Cl.[4] F02P *5/04*; F02M *25/08*
U.S. Cl. 123—406 **13 Claims**



1. A method for controlling hydrocarbon emissions from an internal combustion engine having an air/fuel intake coupled to a fuel vapor recovery system, comprising the steps of:

providing engine spark timing to said internal combustion engine;

periodically purging fuel vapors from said fuel vapor recovery system into said air/fuel intake;

retarding said engine spark timing whenever said step of purging is initiated; and

advancing said engine spark timing back to its timing before said step of purging was initiated.

4,715,341
METHOD OF AND DEVICE FOR AUTOMATICALLY ADJUSTING THE IGNITION TIMING OF A CONTROLLED IGNITION ENGINE

Andre Douaud, Puteaux, and Joseph Rialan, Meudon, both of France, assignors to Institut Francais du Petrole, Rueil-Malmaison, France

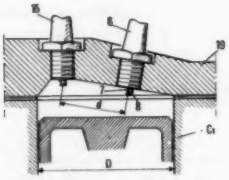
Continuation-in-part of Ser. No. 241,159, Mar. 6, 1981, abandoned, which is a continuation of Ser. No. 61,125, Jul. 26, 1979. This application Oct. 6, 1981, Ser. No. 309,148
Claims priority, application France, Jul. 26, 1978, 78 22542
Int. Cl.[4] F02P *5/04*
U.S. Cl. 123—425 **16 Claims**

1. A method of adjusting the ignition timing of a controlled ignition engine comprising at least two cylinders having knock detecting means associated therewith, and means for adjusting,

according to the spark timing in each cylinder, the angular position of the crankshaft to correspond to the time the flame front reaches in each cylinder a fixed reference position, the method comprising:

(a) adjusting the ignition timing when knocking occurs in at least the one cylinder wherein said knocking is detected, to eliminate said knocking;

(b) in the absence of knocking, and separately for each cylinder, detecting the passage of the flame front through said reference position, and when said detection is performed a predetermined number of times P for a number of cycles of operation of the engine at most equal to a predetermined number Q, generating an average value of the values of the angular position of the crankshaft corresponding to the times when said flame front is detected, and producing a new value for the ignition timing based on said average value of the angular position with respect to which said average value is a predetermined value, the new value for the ignition timing for said one cylinder being-used for controlling the ignition timing of the other cylinder if the number of times the flame front is detected in the other cylinder is less than the value P for said number of cycles Q; and



(c) in the absence of knocking and when the detecting of the number of flame fronts in each cylinder, being not less than P for the number of cycles Q, adjusting the ignition timing in each cylinder by a predetermined amount which is a function of at least one parameter characteristic of the operation of the engine.

4,715,342

SYSTEM FOR CONTROLLING THE IGNITION TIMING OF AN INTERNAL COMBUSTION ENGINE

Masaaki Nagai, Fuchu, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 26, 1985, Ser. No. 813,434

Claims priority, application Japan, Dec. 28, 1984, 59-280561

Int. Cl.[4] F02P *5/04*

U.S. Cl. 123—425 **2 Claims**

1. A system for controlling ignition timing of an internal combustion engine having a microprocessor and an ignition timing control device comprising:

sensing means for sensing engine speed of the engine;

a knock sensor for sensing engine knock and for producing a knock signal;

a first maximum ignition timing table storing a plurality of degrees of ignition timing each producing a maximum engine torque dependent on engine speed with low-octane gasoline without the knock occurring;

a second maximum ignition timing table storing a plurality of degrees of ignition timing each producing a maximum engine torque dependent on engine speed with high-octane gasoline without the knock occurring;

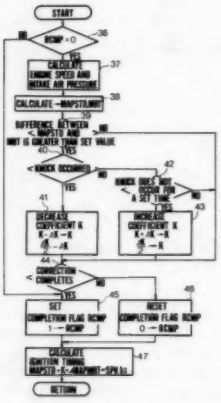
first means for obtaining a first ignition timing from the first maximum ignition timing table in accordance with the engine speed;

second means for obtaining a second ignition timing from the second maximum ignition timing table in accordance with the engine speed;

third means for obtaining a coefficient having a value between zero and one,

fourth means responsive to the knock signal for correcting the coefficient by a correcting quantity in a direction to prevent the engine knock;

fifth means for producing a corrected ignition timing based on either of said first ignition timing or said second ignition timing and an additional quantity dependent on the corrected coefficient; and



sixth means for storing the corrected ignition timing for operation of the engine;

the additional quantity comprises multiplying the corrected coefficient and the different between the first and second ignition timings.

4,715,343

METHOD AND APPARATUS FOR CONTROLLING HEATER FOR HEATING AIR-FUEL RATIO SENSOR

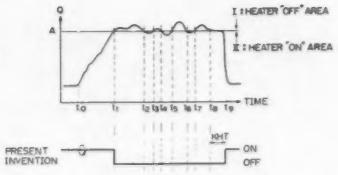
Yoshiaki Kinoshita, Susono, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed Sep. 16, 1986, Ser. No. 907,819

Claims priority, application Japan, Sep. 17, 1985, 60-203407; Sep. 17, 1985, 60-203408; Sep. 20, 1985, 60-206387

Int. Cl.[4] F02D *41/14*

U.S. Cl. 123—489 **22 Claims**



1. A method for controlling a heater for heating an air-fuel ratio sensor provided in an exhaust gas flow passage of an internal combustion engine comprising the steps of:

detecting a driving condition parameter of said engine;

determining whether or not said parameter is larger than a predetermined value;

turning ON said heater when said parameter is not larger than said predetermined value;

turning OFF said heater when said parameter is larger than said predetermined value; and,

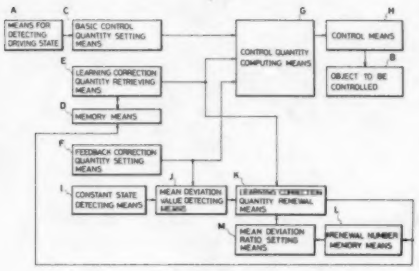
delaying the turning ON of said heater with a predetermined delay time when said parameter is not larger than said predetermined value.

4,715,344

LEARNING AND CONTROL APPARATUS FOR ELECTRONICALLY CONTROLLED INTERNAL COMBUSTION ENGINE

Naoki Tomisawa, Takasaki, Japan, assignor to Japan Electronic Control Systems, Co., Ltd., Japan

Filed Aug. 1, 1986, Ser. No. 891,967
Claims priority, application Japan, Aug. 5, 1985, 60-171223; Sep. 24, 1985, 60-208913
Int. Cl.[4] F02M 51/00
U.S. Cl. 123—489 12 Claims



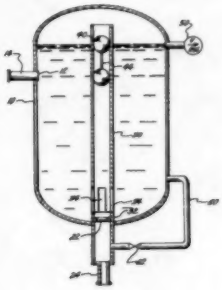
1. A learning and control apparatus for an electronically controlled internal combustion engine, which comprises means for detecting driving states of the engine, an object to be controlled according to a control value, basic control quantity setting means for setting a basic control quantity corresponding to an aimed control value of the object to be controlled which is decided based on the detected engine driving state, reloadable memory means for storing a plurality of regions with parameters of the engine driving state and learning correction quantities for correcting said basic control quantity for the respective regions, learning correction quantity retrieving means for retrieving the learning correction quantity of the corresponding region from said memory means based on the detected actual engine driving state, feedback correction quantity setting means for comparing the aimed control value with the detected actual value of the object to be controlled and setting a feedback correction quantity for correcting said basic control value by increasing or decreasing the feedback correction quantity by a predetermined quantity so that the actual value is brought close to the aimed control value, control quantity computing means for computing a control quantity from the basic control quantity set by said basic control quantity setting means, the learning correction quantity retrieved by said learning correction quantity retrieving means and the feedback correction quantity set by said feedback correction quantity setting means, control means for controlling the object to be controlled according to said control quantity, constant state detecting means for detecting a constant driving state of the engine actually driven, mean deviation value detecting means for detecting and operating a mean value of deviations of the feedback correction quantities from a standard value when the engine is in the constant driving state, learning correction quantity renewal means for operating a new learning correction quantity by adding said mean value of deviations by a selected ratio to a present learning correction quantity retrieved by said learning correction retrieving means at every completion of said mean value deviations operation and for renewing the leaning correction quantity stored in the memory means under the same driving regions by said new learning correction quantity, renewal number memory means for storing number of renewal of learning correction quantity in said memory means by receiving the output from said learning correction quantity renewal means under the same engine driving region, and mean deviation ratio setting means for setting said ratio of mean value of deviations of the feedback correction quantities in accordance with the number of learning correction quantity in such a manner as the ratio decreases when the number of renewal increases.

4,715,345

AUTOMATIC FUEL SHUT OFF SYSTEM FOR FUEL-INJECTED ENGINES

Carter Reames, Jr., 1845-B Starboard, Baton Rouge, La. 70820

Filed Jul. 18, 1985, Ser. No. 756,254
Int. Cl.[4] F02M 39/00; F16K 31/18
U.S. Cl. 123—512 15 Claims



1. In a fuel-injected internal combustion engine comprising a fuel injection system fed by a main fuel supply, the improvement wherein there is interposed between the fuel supply and the injection system an automatic fuel shut off valve system which comprises:

(a) an air-tight reservoir having

(1) a fuel inlet disposed at its upper portion and connectable to a fuel line leading from the fuel supply for the engine, and

(2) a fuel outlet disposed at the bottom of the reservoir and connectable to a fuel line leading to a fuel injection system;

said reservoir, fuel inlet, and fuel outlet being adapted to maintain a balanced flow of fuel through the reservoir and to maintain a substantially constant volume of liquid fuel within the reservoir so long as fuel continues to enter the reservoir via the fuel inlet;

said reservoir together with said fuel inlet and said fuel outlet constituting the sole passageway by which the fuel line leading to the fuel injection system receives fuel from the fuel supply;

(b) a vertical conduit disposed within the reservoir and extending upwardly from the fuel outlet, the conduit having in its lower portion at least one fuel inlet vent providing communication from the interior of the reservoir outside the conduit to the fuel outlet;

(c) ball valve means including a ball valve and a ball valve seat for sealing off the flow of fuel from the reservoir when the volume of the fuel therein falls to a predetermined smaller quantity, said ball valve means being disposed within said conduit and said ball valve having a specific gravity less than but in proximity to the specific gravity of the fuel so that the ball valve remains afloat in the fuel except when brought into proximity to the ball valve seat as the volume of the fuel within the reservoir approaches said predetermined smaller quantity, and in which case the ball valve is drawn into the valve seat and seals off the flow of fuel into the fuel outlet;

(d) bleed valve means to provide, on actuation, open communication between the exterior of the reservoir and the interior of the upper portion of the reservoir; and

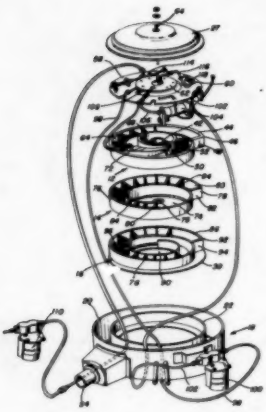
(e) pressure equalization means to enable, on actuation, equalization of pressure on both sides of the situs of the seal created by the ball valve means, without intake of air into the fuel injection system.

4,715,346

CARBURETOR FOR INTERNAL COMBUSTION ENGINE

Beth R. Dempsey, 8249 Standifer Gap Rd., Chattanooga, Tenn. 37421

Filed Apr. 14, 1986, Ser. No. 851,570
Int. Cl.[4] F02M *15/02, 17/26*
U.S. Cl. 123—524 15 Claims



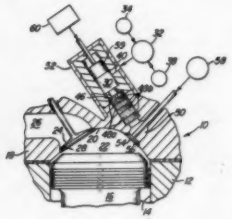
1. A carburetor for an internal combustion engine comprising a plurality of mixing chambers arranged vertically in tandem, each chamber having a floor and spirally extending passageways defined by spaced apart wall means upstanding from the floor leading from a peripheral portion of the respective chamber to a central portion thereof, a first of said chambers having a substantially centrally disposed hollow tube communicating with the passageway of a second next adjacent chamber, said second chamber having an outlet in the passageway at the outer periphery thereof communicating with the passageway of a third chamber adjacent to and below the second chamber, and said third chamber having an outlet in the central portion thereof, a cyclonic funnel formed in the first chamber defined by an annular wall spaced about said hollow tube and an opening in said annular wall communicating with the passageway of the first chamber, means defining a reservoir in said first chamber between said hollow tube and said annular wall for collecting liquid fuel separated in said cyclonic funnel, a conduit communicating with said reservoir, a heater disposed outside said carburetor for receiving and heating liquid fuel so separated, means for communicating the heated liquid fuel with the upper end of said hollow tube for delivery of said heated fuel to the second chamber, cover means on said first chamber for closing the top thereof, said cover means having an aperture communicating with a peripheral portion of the passageway of said first chamber, means for spraying fuel into said aperture, and a housing for supporting said chambers with the lowermost chamber communicating with the intake manifold of said engine and for directing air into said aperture, whereby air and fuel may flow through the passageways of said first chamber and continue through the second and third chambers while unmixed heavy fuel components may collect in said reservoir, be heated and returned through said hollow tube into said second chamber.

4,715,347

METHOD AND APPARATUS FOR PRETREATMENT OF FUEL BY PARTIAL COMBUSTION WITH A COMPOSITE CATALYST

Keith Hampton, and Johannes Schwank, both of Ann Arbor, Mich., assignors to Eaton Corporation, Cleveland, Ohio

Filed Aug. 25, 1986, Ser. No. 899,690
Int. Cl.[4] F02M *31/16*
U.S. Cl. 123—551 9 Claims



1. Apparatus for pretreatment of a fuel for combustion in an oxidizing atmosphere in the combustion chamber of a combustion device comprising:

a source of fuel;

a source of oxidizing fluid:

a mixing chamber for receiving oxidizer fluid from said source;

means for introducing fuel received from said fuel source into said oxidizer fluid in said mixing chamber to create a rich fuel-oxidizer fluid vapor mixture therein substantially above the stoichometric ratio;

catalytic reactor means receiving said rich fuel-oxidizer fluid mixture from said mixture chamber and partially catalytically combusting said mixture to form a high temperature, hydrogen radical-rich product gas;

said catalytic reactor means comprising a composite catalytic bed formed by a composite of diverse catalytic materials acting to cause ignition of said fuel-oxidizer fluid mixture and formation of fuel molecule radicals;

compressor means for compressing said fuel-oxidizer mixture in said mixture chamber prior to passing over said catalytic bed to allow high pressure reaction of said fuel-oxidizer fluid mixture;

means for controllably directing said compressed high temperature product gas into said combustion chamber, whereby enabling enhanced combustion therein as a result of the high temperature condition of said product gas.

4,715,348

SELF-DIAGNOSIS SYSTEM FOR EXHAUST GAS RECIRCULATION SYSTEM OF INTERNAL COMBUSTION ENGINE

Kiyotaka Kobayashi, Aichi; Hidaka Tsukasaki, and Takaaki Baba, both of Kariya, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Aug. 29, 1986, Ser. No. 902,964
Claims priority, application Japan, Aug. 31, 1985, 60-192844; Aug. 31, 1985, 60-192845; Oct. 22, 1985, 60-236783
Int. Cl.[4] F02M *25/06*
U.S. Cl. 123—571 9 Claims

1. A self-diagnosis system for an exhaust gas recirculation system mounted on an internal combustion engine which produces an exhaust gas, the engine having an intake passage, said system comprising:

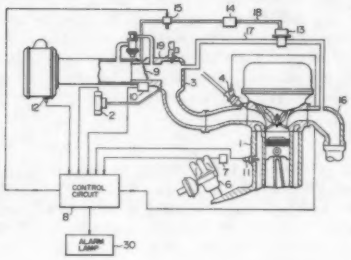
recirculation passage means for selectively recirculating said exhaust gas from an exhaust passage of said engine to said intake passage of said engine;

valve means for opening and closing said recirculation passage means;

detector means for detecting a predetermined operating

parameter of said engine and generating values therefrom, said detector means being provided at a location other than said recirculation passage means, and said predetermined operating parameter being one which is influenced by said exhaust gas recirculated through said recirculation passage means;

storage means for storing values of said operating parameter detected by said detector means when said recirculation passage means is opened and closed, respectively;



means for calculating a difference between said detected values of said operating parameter stored in said storage means; and

means for comparing said calculated difference with a predetermined reference thereby to discriminate whether or not said exhaust gas recirculation system is in an abnormal state.

4,715,349

AIR INTAKE SIDE SECONDARY AIR SUPPLY SYSTEM FOR AN INTERNAL COMBUSTION ENGINE WITH AN IMPROVED OPERATION UNDER A SMALL INTAKE AIR AMOUNT

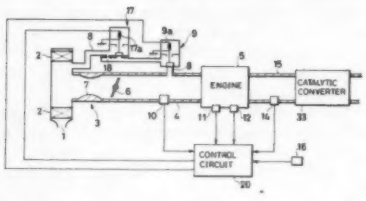
Yoshitaka Hibino, and Takeshi Fukuzawa, both of Wako, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 6, 1986, Ser. No. 915,471

Claims priority, application Japan, Oct. 5, 1985, 60-222171; Oct. 14, 1985, 60-228443

Int. Cl.[4] F02M *23/08*

U.S. Cl. 123—585 **4 Claims**



1. An air intake side secondary air supply system for an internal combustion engine having an intake air passage with a carburettor and an exhaust gas passage, comprising:

an air intake side secondary air supply passage leading to the intake air passage, at a position downstream of said carburettor;

a first open-close valve disposed in said air intake side secondary air supply passage;

an oxygen concentration sensor disposed in said exhaust passage and producing an output signal;

duty control unit responsive to said output signal of said oxygen concentration sensor and connected to said first open-close valve, operative to repeatedly calculate a valve open time period in a duty cycle in response to a result of determination of air/fuel ratio by using said output signal of said oxygen concentration sensor, and opening said first open-close valve during said output valve open time period in each of said duty cycle;

means for detecting an amount of an intake air of said internal combustion engine; and

means for restricting an amount of said air intake side secondary air flowing through said air intake side secondary air supply passage when the amount of said intake air is smaller than a predetermined level.

4,715,350

AIR INTAKE SIDE SECONDARY AIR SUPPLY SYSTEM FOR AN INTERNAL COMBUSTION ENGINE WITH A DUTY RATIO CONTROL OPERATION

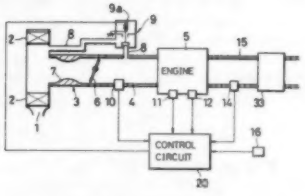
Tomohiko Kawanabe, Utsunomiya; Noritaka Kushida, Tokyo; Masahiko Asakura, Tokorozawa, and Yasunari Seki, Utsunomiya, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 14, 1986, Ser. No. 818,637

Claims priority, application Japan, Feb. 16, 1985, 60-28759

Int. Cl.[4] F02M *23/04*

U.S. Cl. 123—587 **3 Claims**



1. An air intake side secondary air supply system for an internal combustion engine having an air intake passage with a carburetor and an exhaust passage, comprising:

an air intake side secondary air supply passage communicating with the air intake passage on the downstream side of the carburetor;

an open/close valve disposed in said air intake side secondary air supply passage;

an oxygen concentration sensor disposed in the exhaust passage and producing an output signal whose level is substantially proportional to an oxygen concentration of the exhaust gas;

means for setting a target air-fuel ratio in response to at least two parameters representing engine operation; and

comparing means for comparing the output signal of said oxygen concentration sensor and a level corresponding to said target air-fuel ratio;

control means for continuously controlling an opening ratio of said open/close valve, said control means calculating said opening ratio in response to a result of comparison between the output signal of the oxygen concentration sensor and said level corresponding to said target air-fuel ratio and supplying an opening ratio control signal at predetermined intervals, so that said open/close valve is opened or closed in response to said ratio control signal which is supplied at said predetermined intervals.

4,715,351

SUPPLEMENTAL AIR VALVE FOR INTERNAL COMBUSTION ENGINE

Chester W. Pankow, 1830 N. 37th St., Phoenix, Ariz. 85012

Filed Aug. 25, 1986, Ser. No. 900,088

Int. Cl.[4] F02M *123/04*

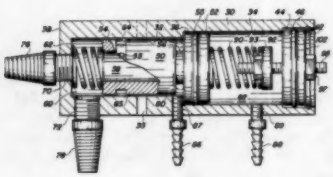
U.S. Cl. 123—587 **3 Claims**

1. A valve for attachment in the PCV system of an internal combustion engine for regulating the admission of supplemental air to the crank case blow-by return, said valve comprising: (a) a valve body defining a bore, said body having an inlet and

an outlet connection defining a passageway through said valve for the blow-by return, said body further defining a port for air;

(b) a valve member reciprocal within said bore having a piston member dividing at least a portion of said bore into two pressure chambers, said pressure chambers having means for connection of each to a source of engine vacuum;

(c) said valve member being shiftable from and open position



permitting air to enter through said port to said passageway and having a closed position blocking admission of air through said port to said passageway; and

(d) resilient means normally urging said valve body to said closed position, said resilient means being selectively adjustable to provide a predetermined biasing force whereby said piston is shiftable to said open position in response to changes in engine vacuum to admit supplemental air to the engine.

4,715,352

AIR INTAKE SIDE SECONDARY AIR SUPPLY SYSTEM FOR AN INTERNAL COMBUSTION ENGINE WITH A DUTY RATIO CONTROL OPERATION

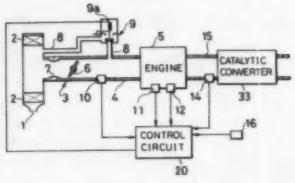
Tomohiko Kawanabe; Masahiko Asakura; Noritaka Kushida, and Katsuhiko Kimura, all of Wako, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 29, 1986, Ser. No. 912,038

Claims priority, application Japan, Sep. 30, 1985, 60-218503

Int. Cl.[4] F02M *23/04*

U.S. Cl. 123—589 **1 Claim**



1. An air intake side secondary air supply system for an internal combustion engine having an intake air passage with a carburettor and an exhaust gas passage, comprising:

an air intake side secondary air supply passage leading to the intake air passage, at a position downstream of said carburettor;

an open-close valve disposed in said air intake side secondary air supply passage;

an oxygen concentration sensor disposed in said exhaust passage and producing an output signal whose level is generally proportional to an oxygen concentration of an exhaust gas of the engine; and

duty control unit responsive to said output signal of said oxygen concentration sensor and operative to control said open-close valve, including means for determining a base valve open time period in a duty cycle of a predetermined time period using a plurality of predetermined operational parameters of said engine at an interval of said predetermined time period, means for detecting whether an air/fuel ratio of a mixture supplied to the engine is leaner or richer than a target air/fuel ratio at most an interval of said predetermined time period, means for calculating an output valve open period by decreasing said base valve open time period by a first correction value when a result of the detection of said air/fuel ratio is "lean", and by increasing said base valve open time period by a second correction value when the result of the detection of said air/fuel ratio is "rich", and means for opening said open/-close valve during said output valve open period in each of said duty cycle, wherein said duty control unit further includes means for increasing said first correction value only when the air/fuel ratio of the mixture has changed from rich to lean with respect to said target air/fuel ratio, and increasing said second correction value only when the air/fuel ratio of the mixture has changed from lean to rich with respect to said target air/fuel ratio.

4,715,353

ULTRASONIC WAVE TYPE FUEL ATOMIZING APPARATUS FOR INTERNAL COMBUSTION ENGINE

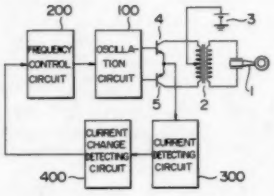
Hiroshi Koike, Katsuta; Hiroshi Katada, Mito, and Hiroshi Yoneda, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Automotive Engineering Co., Ltd., Katsuta, both of, Japan

Filed Dec. 19, 1986, Ser. No. 943,748

Claims priority, application Japan, Dec. 25, 1985, 60-290652

Int. Cl.[4] F02M *29/00*

U.S. Cl. 123—590 **6 Claims**



1. An ultrasonic wave type fuel atomizing apparatus for an internal combustion engine for supplying atomized fuel to said internal combustion engine, comprising:

an ultrasonic wave vibrator provided in an intake passage of said internal combustion engine for atomizing fuel supplied thereto by vibrating at ultrasonic wave frequencies;

an oscillation circuit for producing ultrasonic waves used to drive said ultrasonic wave vibrator;

means for supplying an oscillation output of said oscillation circuit to said ultrasonic wave vibrator by increasing the oscillation output; and

a feedback circuit for controlling an oscillation frequency of said oscillation circuit in accordance with an output of said ultrasonic vibrator.

4,715,354

FUEL-ECONOMY AND EMISSION-CONTROL DEVICE FOR INTERNAL COMBUSTION ENGINES

Roberto Longobardi, Viale Europa, 2/E, Castellammare di Stabia, 80053, Italy

PCT No. PCT/IT85/00023, § 371 Date Apr. 3, 1986, § 102(e) Date Apr. 3, 1986, PCT Pub. No. WO86/01258, PCT Pub. Date Feb. 27, 1986

PCT Filed Jul. 30, 1985, Ser. No. 862,224

Claims priority, application Italy, Aug. 3, 1984, 40426 A/84

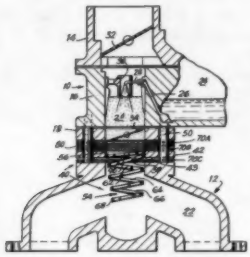
Int. Cl.[4] F02M *29/00*

U.S. Cl. 123—590 **7 Claims**

1. An improved fuel-economy and emission-control device for internal combustion engines, of a type having at least one spiral mixer element, and means for mounting said element downstream of a carburetor and upstream of an inlet manifold

internally of an coaxial with a passage through which a fuel-air mixture is directed, wherein the mixer element is a spiral element having a given number of turns which gradually decrease in diameter along the fuel-air mixture passage, and means for mounting the spiral mixer element, said means comprising a mounting flange having a tapered central opening which supports the mixer element, the improvement comprising:

a radial bore coplanar with and passing through the mounting flange so as to communicate with the central opening,



through which a fluid supplied by an external intake means may be directed into the central opening and into the inlet manifold,

wherein the intake means connected to the radial bore comprises, in turn, a solenoid-operated cleaner valve, a solenoid-operated metering valve, and a bypass valve connected to both an air cleaner and a blow-by system for adding vaporized oil to said fluid, said intake means components being connected and in fluid communication via small-bore hoses.

4,715,355

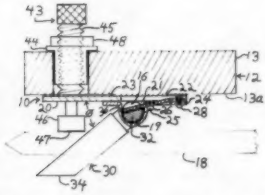
ARROW REST FOR ARCHERY BOW

Krail N. Lattig, 2236 S. Pasfield, Springfield, Ill. 62704

Filed Mar. 26, 1986, Ser. No. 844,368

Int. Cl.[4] F41D *10/00*

U.S. Cl. 124—41 A **45 Claims**



42. An arrow rest assembly for mounting to the side of a bow for supporting an arrow, the assembly comprising:

a base;

a generally L-shaped arrow support having a first leg journaled in the base about a vertical axis parallel to the longitudinal axis of the bow, and a second leg extending generally horizontally and pivotable in a generally horizontal plane;

a flat cam surface on the first leg of the arrow support;

means for engaging the flat cam surface on the first leg to resiliently bias the second arm generally laterally outwardly from the bow, said engaging means allowing the second arm to pivot forward and backward in a horizontal plane.

4,715,356

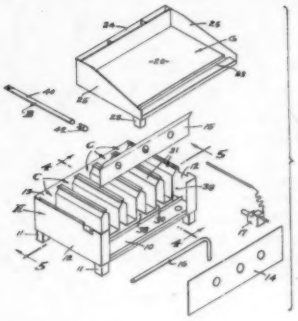
GAS BURNER WITH HEAT REFLECTIVE RADIANTS FOR CONTROLLED HEAT CONCENTRATION

Howard S. Reynolds, 1192 Mitchell Ave. No. 50, Tustin, Calif. 92680

Continuation-in-part of Ser. No. 759,160, Jul. 26, 1985, abandoned. This application Jan. 20, 1987, Ser. No. 4,669

Int. Cl.[4] F24C *3/00*

U.S. Cl. 126—39 H **18 Claims**



1. In a gas stove, the combination of a plurality of adjacent burner-combustion chambers and each which directly heat isolated portions of a griddle plate, and each including:

a single straight elongated burner tube supplied by control means with gas and with primary combustion air from a primary air intake plenum, and having burner ports discharging therealong at a common plane spaced below the griddle plate,

a pair of straight and parallel baffles below the burner and extending upward to said plane and closely spaced from the opposite sides of the burner and forming a secondary air intake plenum supplying secondary combustion air to the burner,

a pair of radiants diverging upwardly from the pair of baffles at said plane and each extending to a seal at the underside of the griddle plate and forming an isolated combustion chamber therebetween,

the plurality of burner-combustion chambers being manifolded in parallel relation to each other and with the next adjacent radiants of each pair of burner-combustion chambers being convergent to meet at the underside of the griddle plate,

the secondary intake plenums and the combustion chambers of the plurality of burner-combustion chambers being in open communication at said common plane and all isolated by a wall from the primary air intake plenum,

and the manifolded combustion chambers being open at one end to a flue.

4,715,357

APPARATUS FOR COOKING FOOD

Victor Sherman, 13-10 34 Ave., Long Island City, N.Y. 11106; Ilya Zborovsky, 3285 Wolfson Dr., Baldwin, N.Y. 11510, and William Sanchez, 35-69 169 St., Flushing, N.Y. 11358

Continuation-in-part of Ser. No. 801,781, Nov. 20, 1985, Pat. No. 4,627,335. This application May 20, 1986, Ser. No. 865,091

Int. Cl.[4] F24C *3/00;* **A47J** *27/62;* **A23B** *4/04*

U.S. Cl. 126—39 H **20 Claims**

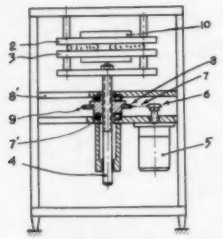
1. An apparatus for cooking food, comprising

two solid plates, said plates being heatable and one of said plates being movable relative to the other of said plates;

means for heating said plates; and

means for driving said one plate so as to move said one plate relative to said other plate so that when an initial food material is placed between said two plates and said plates

have been heated and said one plate has been moved toward said other plate, the initial food material is subjected to the action of heat and pressure of said plates and cooking is performed under the simultaneous action of



high temperature and high pressure, said driving means being formed so that said one plate is movable by said driving means toward said other plate in a stepped manner so that a risk of catching a part of the user's body between said plate is reduced.

4,715,358

AUTOMATIC CONTROL OF INCIDENT SOLAR FLUX

Helmut Köster, Karl-Bieber-Höhe, 6000 Frankfurt am Main, Fed. Rep. of Germany

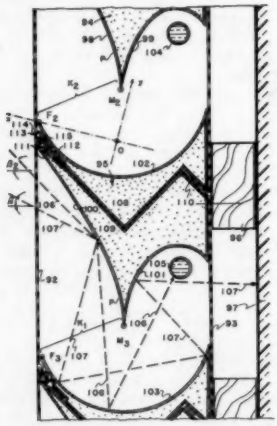
PCT No. PCT/DE80/00088, § 371 Date Feb. 2, 1981, § 102(e) Date Feb. 2, 1981, PCT Pub. No. WO80/02712, PCT Pub. Date Dec. 11, 1980

Continuation of Ser. No. 232,028, Feb. 2, 1981, abandoned. This PCT application Jun. 9, 1980, Ser. No. 814,513

Claims priority, application Fed. Rep. of Germany, Jun. 8, 1979, 2923233; Jul. 25, 1979, 2930103; Oct. 29, 1979, 2942497

Int. Cl.[4] F24J *2/18*

U.S. Cl. 126—439 **15 Claims**



1. Apparatus for control of incident solar radiation, comprising essentially opaque elements (**63, 64; 108, 109; 118, 119**), which are arranged horizontally along their axis and are at intervals from each other along a vertical axis, each opaque element having a reflectng upper surface and reflecting lower surface wherein the reflective upper surface opaque element lies opposite the lower surface of the next adjacemt element, and the lower surface of the next adjacent element lies opposite the upper surface of a second adjacent element, thus admitting radiation between the upper surface of said opaque element and the lower of the adjacent element, characterized by the following chracteristics:

each of the opaque elements is formed as a profile (**63, 64; 108, 109; 118, 119**) having mirror like surfaces;

the upper and lower surfaces of each opaque element (**63, 64; 108, 109; 118, 119**) are different in shape;

at least one portion of the lower surfaces (**63, 69**) of said mirror-profile is parabolic;

the upper and lower surfaces of said mirror-profile established a radiation cross-section as well as a concentration cross-section (K, K_1, K_2); and

the opaque elements (**63, 64; 108, 109; 118, 119**) are provided in between panel-like transparent elements (**61, 62; 92, 93; 116, 117**);

whereby light reflected to an exterior of said apparatus is scattered by double reflection on the different contours of said upper and lower surfaces of said opaque elements.

4,715,359

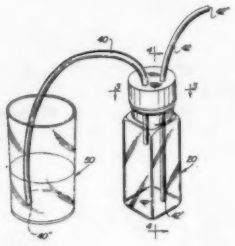
SAFETY BOTTLE AND CAP FOR THE ADMINISTRATION OF LIQUID RADIOACTIVE IODINE

U. Yun Ryo, 2716 Martinique La., Lexington, Ky. 40509

Filed Mar. 28, 1986, Ser. No. 845,259

Int. Cl.[4] A61N *5/12*

U.S. Cl. 128—1.1 **7 Claims**



1. A method of administering liquid solution contained in a bottle, or the like, which bottle is closed by a closure member through which extends a pair of straws; each of said pair of straws having an inner end in fluid communication with the interior of the container or the like, and an outer end exposed to the ambient air, wherein said method comprises:

(a) inserting the outer end of the first of the pair of straws into the patient's mouth for subsequent drawing thereon to drink the contents of the bottle, or the like;

(b) inserting the outer end of the second of the pair of straws into a container having a liquid therein, such that the outer end of the second of the pair of straws is immersed in the liquid;

(c) drawing on the outer end of the first of the pair of straws to draw liquid into the interior of the bottle, or the like, from the container having liquid therein via the outer end of the second of the pair of straws; and

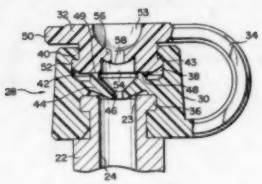
(d) drawing out the liquid mixture in the interior of the bottle, or the like, provided through step (c), from the interior of the bottle to the outside thereof by drawing on the outer end of the first of the pair of straws.

4,715,360

ENDOSCOPE FORCEPS STOPCOCK

Nobuaki Akui; Yasuhiro Ueda, and Akira Suzuki, all of Tokyo, Japan, assignors to Olympus Optical Co., Ltd., Japan

Division of Ser. No. 773,122, Sep. 6, 1985, Pat. No. 4,653,477.
This application Jan. 7, 1987, Ser. No. 1,157
Claims priority, application Japan, Sep. 13, 1984, 59-139279; Oct. 5, 1984, 59-209455; May 22, 1985, 60-109573
Int. Cl.[4] A61B *1/00*
U.S. Cl. 128—4 12 Claims



1. An endoscope forceps stopcock fitted to an insertion mouthpiece provided at an insertion port of an insertion channel of an endoscope allowing for the insertion of medical instruments which comprises:

a substantially cylindrical first member fitted to the insertion mouthpiece, said first member including an engagement section formed at one end opening thereof to be detachably engaged with the insertion mouthpiece, another engagement section formed at another end opening of the first member, and a valve section provided between both engagement sections in the first member to close the insertion port of the insertion channel;

a second member removably fitted to the another engagement section of the first member and having a second valve section located to face the first valve section, said first and second valve sections having insertion sections allowing for the insertion of medical instruments, respectively, and at least one of the insertion sections being normally closed by the elasticity of the valve section; and

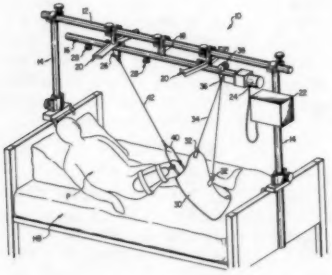
a coupling member for connecting the first and second members.

4,715,361

PASSIVE MOBILIZER

Donald M. Mauldin, and Richard E. Jones, III, both of 3D Orthopedic, Inc., 11126 Shady Trail, Ste. #107, Dallas, Tex. 75229

Continuation of Ser. No. 625,613, Jun. 28, 1984, abandoned.
This application Sep. 16, 1986, Ser. No. 908,941
Int. Cl.[4] A61H *1/02*
U.S. Cl. 128—52 27 Claims



1. Apparatus for exercising the human extremities about a joint which comprises:

an elongate track;

means for supporting the elongate track above the extremity to be exercised;

a carriage supported by the elongate track;

means for moving the carriage along the elongate track;

means for reversing the direction of movement of the carriage along the elongate track;

first support means for connecting the carriage to the extremity to be exercised whereby the extremity to be exercised is moved in response to the movement of the carriage along the elongate track and is allowed to rotate about an axis defined by the length of the extremity such that the joint rotates in an anatomically correct motion; and

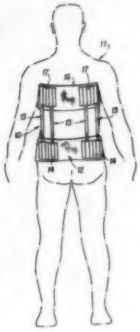
second support means connected to the extremity to be exercised and to the elongated track, said second support movable along the elongate track in response to movement of the extremity to be exercised.

4,715,362

AMBULATORY LUMBO-SACRAL TRACTION SYSTEMS AND METHODS

Henry Scott, 1109 Rock Creek Dr., Wyncote, Pa. 19095

Filed Feb. 27, 1986, Ser. No. 833,705
Int. Cl.[4] A61H *1/02;* A61F *5/04*
U.S. Cl. 128—75 9 Claims



1. An ambulatory lumbo-sacral back brace for relieving upper body weight from the lower lumbo-sacral region of a patient's spine, the system comprising:

a single upper support member for encircling the patient adjacent the patient's clavicle and beneath the patient's arms, the upper support member being in the form of a first flexible web having a back portion, a front portion and two free ends, with a first adjustable fastening means for connecting the free ends of the webs together to form a first closed loop;

single lower support member for encircling the patient at a location adjacent the pelvis of the patient, the lower support member being in the form of a second flexible web having a back portion, a front portion, and two free ends adjacent the front portion with a second adjustable fastening means for connecting the ends of the web together to form a second closed loop;

a plurality of substantially vertical and parallel longitudinally compressible struts having upper and lower ends, the struts each having individually adjustable internal biasing means for resisting longitudinal contraction;

a plurality of individual strut securing pockets on each of said support members, each said support member having at least one pocket on each side of the spine, none of said pockets being aligned with the patient's spine, said pockets receiving individual struts and securing the struts between the upper and lower support members with the struts being selectively removable from the pockets, the strut

securing pockets being positioned at a plurality of longitudinally spaced locations on the upper and lower support members, the spaced locations being distributed over the back portions of the webs on both side of the spine when the system is placed on a patient, each of the strut securing pockets extending laterally with respect to its respective web for securing the strut to the web adjacent both the top and bottom edge thereof to prevent the strut from pivoting with respect to the webs, whereby the struts are selectively secured to the upper and lower support members at selected longitudinal locations on the belts and are individually adjustable in longitudinal force according to the needs of the patient using the system.

4,715,363

KNEE BRACE WITH EXTENSION ANGLE ESTABLISHING MEANS

Garnett E. Detty, 13755 E. Camino Cartamo, Tucson, Ariz. 85749

Filed Sep. 26, 1986, Ser. No. 912,906
Int. Cl.[4] A61F *3/00*
U.S. Cl. 128—80 C **12 Claims**

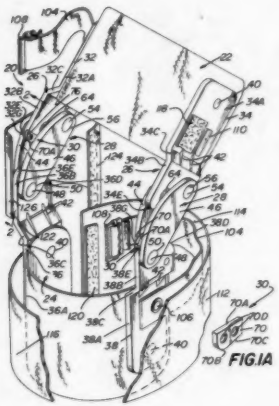


FIG.1A

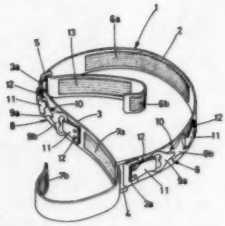
1. A brace for controlling the degree of motion of a bone joint comprising a first cuff member arranged to be releasably secured to a portion of the person's body on the side of said joint, a second cuff member arranged to be releasably secured to a portion of the person's body on the other side of said joint, a pair of elongated first brace members extending on opposite sides of said first cuff member, a pair of elongated second brace members extending on opposite sides of said second cuff member, each of said brace members having an end portion including an end face, and wherein the end face of one of said first brace members includes a recess therein and wherein the end face of one of said second brace members includes a recess therein, first hinge means including a link connected between the end portion of one of said first brace members and the end portion of one of said second brace members and second hinge means including a link connected between the end portion of the other of said first brace members and the end portion of the other of said second brace members, together forming a polycentric hinge, and a plural stop means each in the form of a respective insert having a peripheral stop surface and wherein anyone of said stop means being selected for releasable securement in one of said recesses whereupon its stop surface forms the end face of the brace member to which it is secured, and which stop surface is arranged to engage the end face of the brace member hingedly connected thereto, said selected stop means, hinge means and brace members cooperating with one another to enable the person's joint to be straightened up to a maximum angle and no further, said maximum angle being established by the stop surface of said selected stop means engaging the end face of the brace member hingedly connected thereto, each of said plural stop means being arranged when secured to said brace member to establish a different maximum angle, whereupon said person can, by the selection of the appropriate stop means, fix the maximum angle that the brace will enable the joint to assume.

4,715,364

PELVIS LOCKING BELT

Katsumasa Noguchi, 42-13, Kabukicho 2 chome, Shinjuku-ku, Tokyo, Japan

Filed Apr. 18, 1986, Ser. No. 853,488
Claims priority, application Japan, Jun. 19, 1985, 60-131946
Int. Cl.[4] A61F *5/24*
U.S. Cl. 128—96.1 **7 Claims**



1. An adjustable pelvis locking belt comprising a front belt section of non-expandable material and a back belt section of non-expandable material, a first annular connecting member connected to a first end portion of said front belt section, a second annular connecting member connected to a first end portion of said back belt section, said front belt section having a second end portion which passes through said second annular connecting member and which folds back on itself to a position superimposed on a first part of said front belt section, first adjustable fastening means adjustably fastening said folded back second end portion of said front belt section and said first part of said front belt section, said back belt section having a second end portion which passes through said first annular connecting member and which folds back on itself to a position superimposed on a first part of said back belt section, second adjustable fastening means adjustably fastening said folded back second end portion of said back belt section and said first part of said back belt section, pressing means on each of said front and back belt sections, mounting means on each of said front and back belt sections mounting said pressing means on the outer side of the respective front and back belt sections, each of said pressing means comprising two metal pressing members, each of said pressing means further comprising pivotal means pivotably connecting each two metal pressing members, each of said pressing members having a curved inner surface corresponding to the curvature of the loins of a human body, whereby said first and second adjustable means are adjustable to position said pressing means in a position between the front upper spines of the ilium in the pelvis and the femur trochanter major to press the hypodermic layer therebetween to thereby lock said spines and said femur trochanter.

4,715,365

INTRAUTERINE CONTRACEPTIVE DEVICE

Hugo Cimber, Neufeldstrasse 134, 3012 Bern, Switzerland

Filed Jul. 8, 1986, Ser. No. 883,183
Claims priority, application Switzerland, Jul. 11, 1985, 3015/85
Int. Cl.[4] A61F *5/46*
U.S. Cl. 128—130 **8 Claims**

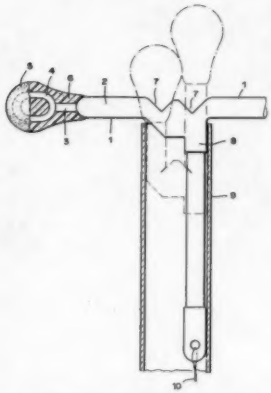
1. An intrauterine contraceptive device of the type to be

introduced into and withdrawn from the uterus by a tube for closing the mouths of the Fallopian tubes, comprising:

a support rod having an outer end;

first and second branches extending laterally from the outer end of the support rod;

the first and second branches including first and second pivots at which the respective branches pivot when entering and leaving the tube;



the first and second branches having enlarged terminal members at the terminal ends of the branches for engagement with the mouths of the Fallopian tube; and

the first and second pivots positioned at first and second distances from the outer end of the support rod, the second distance being substantially greater than the first distance so that when the first and second branches are housed within the tube the enlarged terminal members are axially displaced with the terminal end of the second branch lying behind the terminal end of the first branch.

4,715,366

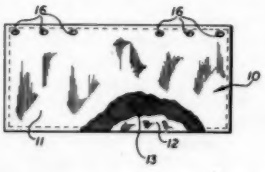
SURGICAL SHIELD

Edward Teeple, 641 Ridgefield Ave., Pittsburgh, Pa. 15216

Filed Apr. 21, 1986, Ser. No. 853,903

Int. Cl.[4] A61F *13/00*

U.S. Cl. 128—132 D **6 Claims**



1. A malleable, lightweight surgical shield for use in an operating room and on a patient during laser procedures comprising:

a. a non-woven fabric polymeric inner sheet,

b. first and second aluminum foil sheets having a matte surface respectively positioned over each side of said fabric inner sheet to coextensively interpose said fabric sheet between said foil sheets; and

c. means for attaching together the respective foil and fabric sheets.

4,715,367

MULTIFUNCTIONAL BEHAVIORAL MODIFICATION DEVICE FOR SNORING, BRUXISM, AND APNEA

Robert B. Crossley, 6600 Elm Creek No. 152, Austin, Tex. 78744

Filed Sep. 15, 1986, Ser. No. 907,462

Int. Cl.[4] A61B *5/10, 5/12*

U.S. Cl. 128—136 **21 Claims**

1. A multifunctional behavioral modification device comprising:

A. a means for detecting clenching and grinding of teeth

B. a means for detecting snoring

C. a means for detecting breathing

D. a pair of electrodes suitable for skin contact for administering an adjustable electric shock

E. battery power means

F. battery powered circuitry suitable for impressing an adjustable electric shock across said electrodes when activated by one of the following:

1. said means for detecting clenching and grinding of teeth

2. said means for detecting snoring

3. said means for detecting breathing indicating that breathing has stopped

G. an electronic counter means for counting the number of times in a given period a current is impressed across said pair of electrodes

H. an enclosure means for said battery powered circuitry.

4,715,368

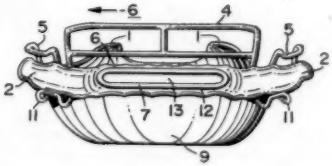
NOCTURNAL AIRWAY-PATENCY APPLIANCE

Peter T. George, Suite 520, 1441 Kapiolani Blvd., Honolulu, Hi. 96814

Filed Aug. 6, 1986, Ser. No. 893,584

Int. Cl.[4] A62B *7/00*

U.S. Cl. 128—136 **1 Claim**



1. A preformed device consisting of a one-piece mouthpiece of orthodontal plastics said device having upper and lower negative impressions which are so configurated so as to fit a patient's mouth's upper and lower teeth; said device having an inward and outward flange extending from said impressions; said device has embedded therein fitted labial arch wire guides along the front upper perimeter of the teeth; and molar wire clasps at the rear on each side of both upper and lower teeth of the outward flange body of the appliance; and with a lip-parting beak integrally molded at the front end of the appliance body with an air-way orifice passage through the same beak.

4,715,369

METHOD OF TREATING AN INJURED PART ON THE ORAL MUCOSA AND THE COVERING MATERIAL FOR USE THEREOF

Yoshiki Suzuki; Hiroshi Ikura, both of Hino; Gentaro Yamashita, Tachikawa, and Tsuneji Nagai, Taito, all of Japan, assignors to Teijin Limited, Osaka, Japan

Continuation of Ser. No. 741,064, Jun. 25, 1985, abandoned, which is a continuation of Ser. No. 594,951, Apr. 2, 1984, abandoned, which is a continuation of Ser. No. 335,418, Dec. 29, 1981, abandoned. This application Feb. 9, 1987, Ser. No. 13,175

Claims priority, application Japan, Dec. 29, 1980, 55-185294

Int. Cl.[4] A61L *15/01;* A61K *9/24*

U.S. Cl. 128—156 3 Claims

1. A method for treating an injured part on the oral mucosa, which comprises covering the injured part with a covering material consisting of a medicament-free adhesive layer consisting essentially of cellulose lower alkyl ether and polyacrylic acid or its pharmaceutically acceptable salt and a medicament-free nonadhesive layer which has no adhesion to the wet surface of the oral mucosa.

4,715,370

OVERFLOW TRAP FOR ANESTHETICS

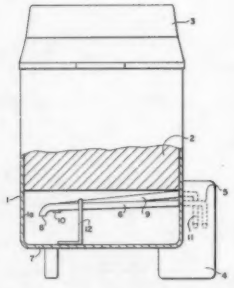
Ulrich Altner, Bad Segeberg; Wolfgang Falb, Klein Wesenberg; Martin Ryschka, Stockelsdorf, and Carl-Friedrich Wallroth, Lübeck, all of Fed. Rep. of Germany, assignors to Drägerwerk Aktiengesellschaft, Fed. Rep. of Germany

Filed Dec. 11, 1986, Ser. No. 940,627

Claims priority, application Fed. Rep. of Germany, Dec. 14, 1985, 3544302

Int. Cl.[4] A61M *15/00*

U.S. Cl. 128—204.13 4 Claims



1. An overflow trap for a reservoir for having liquid anesthetics therein, comprising an anesthetic tank having a bottom and opposite side walls, an anesthetic inlet conduit extending into said tank and sloping downwardly toward the bottom of said tank, and an anesthetic overflow conduit extending into said tank and sloping downwardly to an inlet opening within the tank which is at a lower level from the remaining portion of said overflow conduit, said inlet conduit ending at an opening, said openings of said inlet and overflow conduits being spaced above the bottom of said tank, each of said inlet and overflow conduits extending from the same one of said opposite side walls almost to the other of said opposite side walls, the slant of each of said inlet and overflow conduits being slight between said opposite side walls.

4,715,371

LUNG-CONTROLLED DIAPHRAGM VALVE

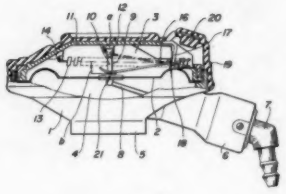
Hans Haas, Lubeck, Fed. Rep. of Germany, assignor to Dragerwerk A.G., Fed. Rep. of Germany

Filed Oct. 28, 1986, Ser. No. 924,358

Claims priority, application Fed. Rep. of Germany, Nov. 8, 1985, 3539668

Int. Cl.[4] A61M *16/00*

U.S. Cl. 128—204.26 6 Claims



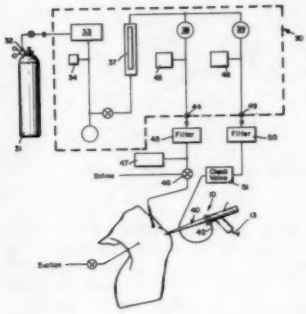
1. In a lung-controlled diaphragm valve having a valve housing defining a space with a valve diaphragm connected to said housing and extending across said space to divide space into an outer chamber and an inner chamber, the improvement comprising a tappet fixed to said diaphragm and extending into said outer chamber, said tappet having a ram which is spaced from said diaphragm, an inlet valve connected to said housing and communicating with said inner chamber for supplying breathing gas to said inner chamber, a valve lever connected to said inlet valve and engagable by said diaphragm to open said inlet valve, a connecting fitting connected to said housing and communicating with said inner chamber for connection to a respiratory mask for a user, a tilting lever pivotally mounted to said housing in said outer chamber, said tilting lever having a first arm portion engagable with said diaphragm and with said ram, and a second arm portion spaced from said first arm portion, an outer chamber housing enaged over said valve housing and including an actuating element moveable into said outer chamber and against said second arm portion of said tilting lever to move said first arm portion away from said diaphragm and toward enagement with said ram, and at least one spring connected between said housing in outer chamber and said tilting lever for biasing said first arm portion into engagement with said diaphragm when said tilting lever is in a pressure position engaged with said diaphragm, and for biasing said first arm portion away from said diaphragm and into engagement with said ram when said tilting arm is in a disconnecting position, said ram of said tappet being spaced from an inner surface of said housing by a residual stroke distance when said tilting lever is in its pressure position with said valve lever closing said inlet valve, said tilting lever having a dead center position between its pressure position and its disconnecting position, under the influence of said spring, the distance between said pressure position and said dead center position for said first arm portion comprising a residual tilting distance, said residual tilting distance being greater than said residual stroke distance, said first arm portion of said tilting lever being moveable from said pressure position up to a position of engagement with said ram without moving said tappet, and said tilting lever being moveable into its disconnecting position with said first arm portion being engaged with said ram and pushing said ram under the influence of said spring into engagement with the inner surface of said housing in said outer chamber.

4,715,372

GAS INSUFFLATION APPARATUS FOR USE WITH AN ARTHROSCOPIC LASER SYSTEM

Jay E. Philippbar, 17931 Skypark Cir., Suite E, Irvine, Calif. 92714; Chadwick F. Smith, 1127 Wilshire Blvd., Los Angeles, Calif. 90017, and Leroy V. Sutter, Jr., 17931 Skypark Cir., Suite E, Irvine, Calif. 92714

Filed Jun. 12, 1985, Ser. No. 743,939
Int. Cl.[4] A61B *17/36*
U.S. Cl. 128—303.1 1 Claim



1. A combination of an arthroscopic attachment and a gas insufflation apparatus for use with a cylinder containing a gas at high pressure and a single stage regulator which is fluidly and mechanically coupled to the cylinder and which regulates the inlet pressure of the gas, said combination comprising:

a. a filter which is fluidly coupled to the single stage regulator;

b. an inlet relief valve which is fluidly coupled to said filter and which insures that the inlet pressure of the gas does not exceed a predetermined pressure;

c. an inlet pressure gauge which is fluidly coupled to said filter and said inlet relief valve and which is used to read the inlet pressure;

d. a control valve which is fluidly coupled to said filter and said inlet relief valve and which turns the flow of the gas through said gas insufflation apparatus on and off;

e. a flow meter which is fluidly coupled to said control valve and which measures the flow of the gas through said gas insufflation apparatus; and

f. a first regulator which has a first outlet relief valve and which is fluidly coupled to said flow meter;

g. a hollow guide member which directs a beam of light energy from a laser system to a surgical target wherein said hollow guide member has an output tip;

h. coupling means for optically coupling said beam of light to said guiding means, said coupling means being mechanically coupled to said hollow guide member;

i. focusing means for focusing said beam of light energy so that the diameter of said focused beam of light energy is less than 0.8 millimeters at said output tip of said hollow guide member, said focusing means being optically and mechanically coupled to said coupling means;

j. gas inletting means for letting a gas into said hollow guide member, said gas inletting means being mechanically coupled to said coupling means; and

k. a second regulator which has a second outlet relief valve and which is fluidly coupled to said flow meter in order to insufflate the gas directly into said hollow guide member through said gas inletting means at a second preselected pressure which is slightly higher than said first preselected pressure in order to insufflate the gas directly into the knee joint at a first preselected pressure in order to distend the knee joint during arthroscopic surgery.

4,715,373

DEVICES FOR IMPLANTATION OF DEFORMABLE INTRAOCULAR LENS STRUCTURES

Thomas R. Mazzocco, 16534 Buchet Dr., Granada Hills, Calif. 91344, and Mary T. Frenchik, 22240 Schoenborn St., Canoga Park, Calif. 91304

Filed Sep. 27, 1985, Ser. No. 781,399
Int. Cl.[4] A61B *17/36*
U.S. Cl. 128—303 R 13 Claims

1. A surgical device for implantation of deformable intraocular lens in the eye through a relatively small incision made in the ocular tissue, said device comprising:

(a) A generally cylindrical disarticulating holding means at the distal end of the device for receiving an intraocular lens having a deformable optical zone portion therein; said holding means comprising two concentrically aligned cylindrical half sections;

(b) A concentrically aligned sleeve for exerting a prescribed compressive force upon the intraocular lens once contained within the lens holding means, said concentrically aligned sleeve being slidable between retracted positions in which no or little compressive force is exerted on said lens, and a forward position in which a prescribed compressive force is exerted upon at least a portion of said intraocular lens once contained within said lens holding means; and

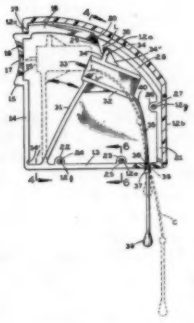
(c) Tab means disposed at a proximate end of the surgical device for facilitating placement of the lens and for convenient effecting release of the deformed lens through a relatively small incision made in the ocular tissue.

4,715,374

DISPOSABLE AUTOMATIC LANCET

Joseph Maggio, Hialeah, Fla., assignor to Medicore, Inc., Hialeah, Fla.

Filed Nov. 14, 1986, Ser. No. 930,515
Int. Cl.[4] A61B *17/32*
U.S. Cl. 128—314 4 Claims



1. In an automatic surgical lancet comprising:

a housing having a seat for receiving the tip of a patient's finger and an opening in said seat for passing a lancet blade;

a spring arm inside said housing having a free end which is movable toward and away from said opening;

a holding element for holding said spring arm cocked in a stressed position in which its free end is held away from said opening;

a lancet blade holder on said free end of said spring arm;

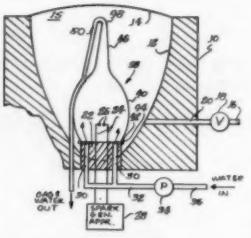
and a lancet blade carried by said holder;
the improvement which comprises:
a pull line attached to said holder and extending outside said housing to be pulled to a position for cocking said spring arm in said stressed position, said pull line having a weakened region near its attachment to said holder which is readily broken by twisting the pull line, whereby to prevent another cocking of said spring arm after the pull line is broken;
said housing having an outer wall segment providing said seat which is inwardly displaceable by a push of the patient's finger against said seat;
and means acting between said displaceable wall segment and said holding element to cause said holding element to release the spring arm from said cocked position for movement of its free end toward said opening when said displaceable wall segment is pushed inward.

4,715,375

DEGASSIFICATION OF WATER IN HYDRAULIC SPARK GAP SHOCK WAVE GENERATOR

Christopher Nowacki, Arlington Heights, and Alfred G. Brisson, Kildeer, both of Ill., assignors to Trutek Research, Inc., Lake Zurich, Ill.

Filed Nov. 7, 1986, Ser. No. 928,524
Int. Cl.[4] A61B *17/22*
U.S. Cl. 128—328 **4 Claims**



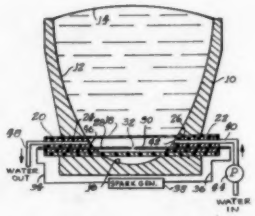
1. Apparatus for generating a shock wave comprising an upwardly opening reflector having its vertex at the lowest portion and opposite the open end, a resilient diaphram across the open end of the reflector, said reflector having a liquid such as water therein, means providing a spark gap in said reflector spaced up from said vertex, a spark across said gap causing a shock wave and producing gas in said liquid, and a flexible enclosure within said reflector upstanding from and adjacent the vetex thereof and substantially completely enclosing said spark gap means, said flexible enclosure being filled with a liquid such as water and isolating said spark gap means from most of the water in said reflector, said enclosure having a volume less than substantially one-half the volume of said reflector, and means for removing from said enclosure gas formed as an incident to discharging a spark across said gap, said diaphram being adapted to be pressed against a living body, and the liquid in said flexible enclosure and in said reflector coupling said shock wave through said diaphram to said living body, enclosure comprising an inverted bag supported by liquid therein, the bag tapering upwardly to an apex, the means for removing gas from the enclosure comprising exhaust means communicating with the interior of the bag adjacent said apex.

4,715,376

ISOLATION OF GAS IN HYDRAULIC SPARK GAP SHOCK WAVE GENERATOR

Christopher Nowacki, Arlington Heights, and Alfred G. Brisson, Kildeer, both of Ill., assignors to Trutek Research, Inc., Lake Zurich, Ill.

Filed Nov. 7, 1986, Ser. No. 928,805
Int. Cl.[4] A61B *17/22*
U.S. Cl. 128—328 **2 Claims**



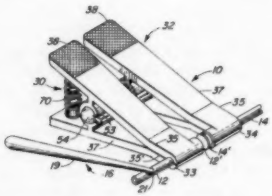
1. Apparatus for generating shock waves comprising a reflector open at one end, a resilient diaphram across the open end of the reflector, said reflector having a liquid such as water therein, means providing a spark gap in said reflector, a spark across said gap generating a shock wave and producing gas in said liquid, isolation means within said reflector closely adjacent to said spark gap means isolating said spark gap means from most of the liquid in said reflector and having a volume of not more than substantially 25% of the volume of said reflector, a liquid such as water being retained about said spark gap means by said isolation means, and means for removing from said isolation means gas formed as an incident to discharging a spark across said spark gap, said diaphram being adapted to be pressed against a living body, and the liquid retained by said isolation means and in said reflector coupling said shock wave through said diaphram to said living body, said reflector being upwardly opening and having a vertical axis of rotation, said isolation means comprising a substantially straight tube transverse of and intersecting said axis, said means for removing gas from said isolation means comprising means for flowing the liquid retained by said isolation means in one end of said tube and out the other.

4,715,377

SURGICAL INSTRUMENTATION INCLUDING A CLAMP ASSEMBLY TO FACILITATE ATTACHMENT OF BLOOD VESSEL SECTIONS

Juan Arroyo, 12200 SW. 93 St., Miami, Fla. 33186

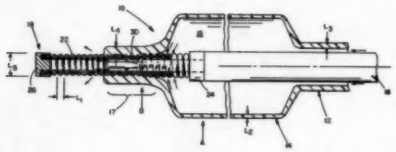
Continuation-in-part of Ser. No. 743,940, Jun. 12, 1985, Pat. No. 4,630,608. This application Oct. 25, 1985, Ser. No. 791,498
The portion of the term of this patent subsequent to Dec. 23, 2003, has been disclaimed.
Int. Cl.[4] A61B *17/08, 17/00*
U.S. Cl. 128—335 **13 Claims**



1. A surgical instrumentation assembly of the type primarily designed for the positioning of open ends of blood vessel sections in aligned relation to one another for attachment thereof, said assembly comprising:

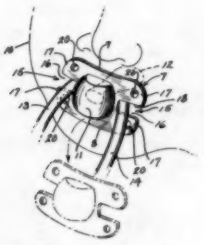
(a) support means for aligned positioning of the vessel sections relative to one another and structured for interior, supporting engagement of both vessel sections,
(b) said support means including an elongated portion disposable in coaxial relation concurrently within both vessel sections,
(c) positioning means structured for exterior engagement with said vessel sections and aligned positioning and maintenance of the open ends into attachable position relative to one another,
(d) said positioning means comprising a clamp assembly including two clamps disposable in interconnected, adjacently spaced relation to one another and each clamp comprising a sleeve element configured and dimensioned for surrounding and engaging relation to respective vessel sections,
(e) said clamp further comprising two elongated lever arms each connected at one end thereof to said sleeve element and extending outwardly therefrom to respective free ends disposed in spaced relation to one another,
(f) a fulcrum structure disposed between said lever arms of each clamp and pivotally interconnected to said lever arms and structured to allow pivotal movement of said lever arms relative to one another,
(g) said lever arms, fulcrum structure and sleeve element of each clamp being of an integral, one piece construction,
(h) securement means for positioning said sleeve elements relative to one another and structured for interconnecting said sleeve elements to one another for maintenance thereof into engageable relation to said respective vessel sections, and
(i) said support means and said sleeve elements relatively structured and dimensioned to maintain the respective vessel sections in sandwiched relation therebetween and the open ends of the vessel sections in adjacent, aligned relation to one another.

4,715,378
BALLOON CATHETER
J. Lee Pope, Jr., Attleboro, and Ronald E. Resden, Norton, both of Mass., assignors to Mansfield Scientific, Inc., Mansfield, Mass.
Filed Jul. 28, 1986, Ser. No. 890,819
Int. Cl.[4] A61M *29/02*
U.S. Cl. 128—344 **4 Claims**



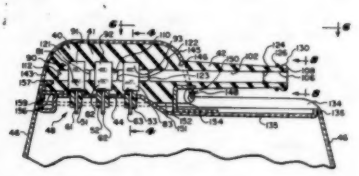
1. A balloon catheter, comprising:
a distal balloon, and
a catheter extending from the proximal end of the balloon, out of the body, forming a conduit for balloon inflation liquid,
said balloon catheter sized and adapted, with said balloon deflated to a relatively small size, for introduction of said distal balloon into the body, and said balloon adapted to be inflated to a relatively larger size by introduction of inflation liquid into said balloon from outside the body, via the conduit formed by said catheter, and
said balloon catheter further comprising vent means disposed at the distal end of said balloon for selectively venting gas above a predetermined pressure from the interior of said balloon and restricting passage of inflation liquid from said balloon,
said vent means comprising a multi-winding coil extending distally from within said balloon,
interstitial spaces generally between the windings of said coil being of a predetermined small size selected to permit passage therethrough of gaseous molecules above a predetermined pressure and to restrict throughpassage of larger molecules of inflation liquid at operating pressure.

4,715,379
PACIFIER
Mary D. McCormick, 4415 N. 64 St., Milwaukee, Wis. 53218
Filed Aug. 28, 1986, Ser. No. 901,280
Int. Cl.[4] A61J *17/00*
U.S. Cl. 128—360 **3 Claims**



1. An infant pacifier (7) for use independent of but along side nonremovable tubes (13, 14) supplying air and food for insertion into an infant's body through its mouth, said pacifier comprising:
(a) a base (8) having a generally peripheral edge (9), said base being adapted to symmetrically engage an infant's face in its mouth area,
(b) a nipple (6) attached to said base,
(c) and a pair of opposed slots (15) disposed in said base and extending into said base from said peripheral edge,
(d) said slots comprising recesses (16) through which said tubes go into the mouth for unrestricted air and food supply, and with said slots being formed in a manner so that said pacifier is freely releasable from said tubes at all positions of the tubes within said slots and falls away from the tubes if said pacifier and/or tube means are disturbed.

4,715,380
CAPPED PACER NECK CONTAINING A CONNECTOR ASSEMBLY
Donald L. Harris, Key Largo, Fla., assignor to Telectronics N.V., Curacao, Netherlands Antilles
Filed Apr. 3, 1986, Ser. No. 848,026
Int. Cl.[4] A61N *1/00*; H01R *11/00*
U.S. Cl. 128—419 P **25 Claims**



1. A cardiac pacing system comprising: a cardiac pacer; and a pacing lead having a distal end and a proximal end having at least one ring electrode thereon; said pacer comprising a metal case mounting electronic/electrical circuitry and a power supply therein and having a top side, a soft pliable elongate neck mounted to said top side of said case, connecting means inside said neck for connecting said cardiac pacer with said

proximal end of said pacing lead, said connecting means comprising at least one generally U-shaped electrical contact, insulated conductor means extending through said top side for coupling said at least one electrical contact to electrical circuitry in said case, said neck having at least one elongate lumen therein into which extends said at least one electrical contact and which has an open end for receiving the proximal end of said pacing lead, and a hard elongate cap which is sized to fit over at least a portion of said neck containing said at least one electrical contact, which is releasably fixed over said neck, and which has a smaller width than the width of said neck so that after said proximal end of said lead is inserted into said lumen, fixing of said cap over said neck will compress said at least one electrical contact against said at least one ring electrode.

4,715,381

BATTERY TEST CIRCUIT FOR A HEART PACEMAKER

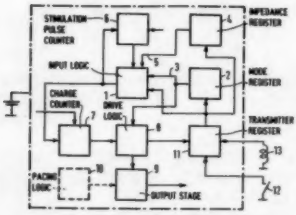
Lennart Moberg, Spanga, Sweden, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Sep. 17, 1986, Ser. No. 908,212

Claims priority, application Fed. Rep. of Germany, Oct. 2, 1985, 3535202

Int. Cl.[4] A61N *1/00*; H05G *0/00*; A61B *5/04*

U.S. Cl. 128—419 PT **5 Claims**



1. A battery test circuit for a heart pacemaker which consumes charge from a battery and thereby changes a charge status of said battery, said pacemaker generating successive stimulation pulses, said battery test circuit comprising:

a stimulation pulse counter for generating a signal corresponding to the number of said stimulation pulses;

means for generating signals corresponding to operating values of said pacemaker;

means for generating a time base signal indicative of elapsed time since a preceding battery test;

logic means connected to said stimulation pulse counter, to said means for generating signals corresponding to said operating values, and to said means for generating a time base signal, said logic means calculating a value based on all of said signals corresponding to the consumed charge of said battery; and

a charge counter memory connected to said logic means for storing values from said logic means generated since said preceding battery test, the content of said charge counter memory representing the present charge status of said battery.

4,715,382

FLAT BIOMEDICAL ELECTRODE WITH REUSEABLE LEAD WIRE

Jerome E. Strand, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Aug. 1, 1986, Ser. No. 892,506

Int. Cl.[4] A61B *5/04*; A61N *1/04*

U.S. Cl. 128—640 **19 Claims**

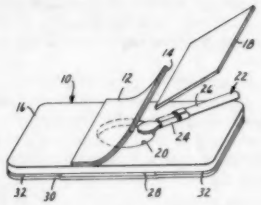
1. A biomedical electrode adapted to be applied to a body, comprising:

a backing material having an aperture, having a top side adapted to be oriented away from said body and having a bottom side adapted to be oriented toward said body;

a protective web at least partially secured to said top side of said backing material and covering said aperture;

a first removeable liner positioned between said protective web and said backing material, said first removeable liner covering at least a portion of the area of said backing material covered by said protective web and covering said aperture;

an electrically conductive adhesive positioned adjacent said backing material on said bottom side of said backing material covering said aperture;



a second removeable liner positioned adjacent said electrically conductive adhesive opposite from said backing material; and

a lead wire having one end for being positioned within said aperture from said top side of said backing material so as to be adhered to said electrically conductive adhesive;

whereby said second removeable liner may be removed and said biomedical electrode may be applied to said body with said electrically conductive adhesive and whereby said first removeable liner may be removed and said lead wire may be positioned with said one end within said aperture and secured by said protective web.

4,715,383

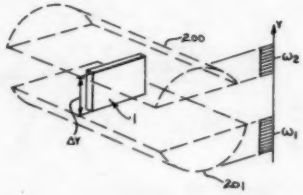
METHOD FOR REDUCING ARTIFACTS IN NMR IMAGES

Richard L. Ehman, and Joel P. Felmlee, both of Rochester, Minn., assignors to General Electric Company, Milwaukee, Wis.

Filed Nov. 10, 1986, Ser. No. 928,504

Int. Cl.[4] A61B *5/05*

U.S. Cl. 128—653 **5 Claims**



1. A method for eliminating artifacts in an NMR image of a volume of interest, the steps comprising:

acquiring NMR data for reconstructing the NMR image as a series of NMR measurements which each excite spins in the volume of interest;

executing a series of saturation pulse sequences which are interleaved with the NMR measurements, wherein each saturation pulse sequence includes the steps of:

(a) producing a magnetic field gradient which establishes Larmor resonant conditions in an adjacent region outside the volume of interest; and

(b) producing a transverse excitation field pulse which causes saturation of spins located in said adjacent region but not in the volume of interest; and

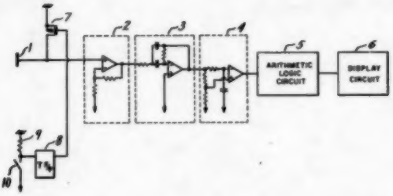
wherein the saturation pulse sequence is executed at a rate which maintains the net longitudinal magnetization of the spins in said adjacent region at a magnitude less than that of the spins in the volume of interest.

4,715,384

PULSIMETER

Junichi Tabata, Tokyo, Japan, assignor to Kabushiki Kaisha Daini Seikosha, Tokyo, Japan

Filed Feb. 2, 1983, Ser. No. 463,160
Claims priority, application Japan, Feb. 3, 1982, 57-15660
The portion of the term of this patent subsequent to Apr. 30, 2002, has been disclaimed.
Int. Cl.[4] A61B *5/02*
U.S. Cl. 128—706 **14 Claims**



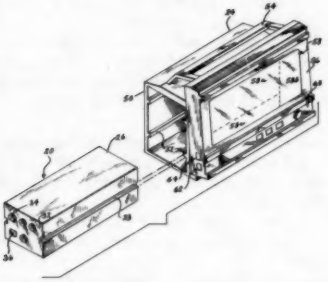
1. In a pulsimeter having a detection electrode for receiving electrocardiac signals of a person and a pulse detection circuit for processing the electrocardiac signals, the improvement comprising: a switching element connected to the detection electrode and connected between an input terminal of the pulse detection circuit and a ground level; and switch means for controlling the conduction state and non-conduction state of the switching element.

4,715,385

PATIENT MONITORING SYSTEM HAVING TRANSPORTABLE DATA MODULE AND DISPLAY UNIT

Michael J. Cudahy, Delray Beach, Fla.; Carlos De La Huerga, Shorewood, Wis.; Harold N. Arneson, Waukesha, Wis.; R. Thomas Divers, and Barry J. Altman, both of Mequon, Wis., assignors to Marquette Electronics, Inc., Milwaukee, Wis.

Filed Sep. 26, 1986, Ser. No. 912,359
Int. Cl.[4] G06F *15/42*; A61B *5/00*
U.S. Cl. 128—710 **16 Claims**



1. A monitoring system for providing continuous, uninterrupted, monitoring of one or more physiological conditions of a patient, including periods of transport of the patient from a location to a destination, said patient having physiological condition data sensors applied thereto, said system comprising:

a substantially non-transportable, first display unit positioned at said location, said first unit providing a data display for the physiological conditions being monitored;

a portable, second display unit capable of accompanying the patient during transport for providing a data display for the physiological conditions being monitored;

a data acquisition and processing module for receiving data from the sensors; and

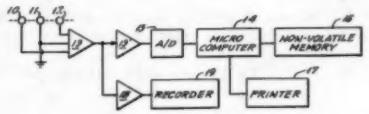
means for coupling said module to said first and second display units in a selected one of the following coupling modes: simultaneously to said first and second display units, individually to said first display unit and individually to said second display unit, so that said module may drive said display units to display data of the physiological conditions being monitored.

4,715,386

COMPUTER-AIDED DRUG-ABUSE DETECTION

Peter G. Martin, Mercer Island, Wash., assignor to National Patent Analytical Systems, Inc., New York, N.Y.

Filed Mar. 14, 1986, Ser. No. 839,614
The portion of the term of this patent subsequent to Mar. 18, 2003, has been disclaimed.
Int. Cl.[4] A61B *5/04*
U.S. Cl. 128—733 **25 Claims**



1. Apparatus for the non-invasive determination whether or not a subject has ingested a particular suspected single drug, said apparatus comprising:

(a) plural electodes adapted for placement in the temple region of the subject's head, and ENG means connected to said electrodes for producing an electronystagmograph waveform for the subject;

(b) said ENG means including an amplifier and analog-to-digital converter means for converting said waveform into a digitally recorded waveform for digital processing;

(c) a digital computer with digital-storage means, wherein said storage means contains digitally stored reference data uniquely characterizing each of a plurality of waveform-component features for said single drug; and

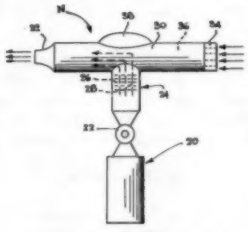
(d) means coacting with said computer for comparing the subject's digitally recorded waveform for possible correlation with the digitally stored reference data for each of said component features.

4,715,387

AEROSOL FOR USE IN THE REDUCTION OF TOBACCO SMOKING

Jed E. Rose, Venice, Calif., assignor to The Regents of the Univ. of California, Berkeley, Calif.

Filed Aug. 23, 1985, Ser. No. 768,966
Int. Cl.[4] A24F *47/00*
U.S. Cl. 131—270 **45 Claims**



1. A method of aiding in the reduction of incidence of to-

bacco smoking by simulating respiratory tract sensations approximating those obtained by inhalation of normal tobacco smoke, said method comprising administering an aerosol to the oral cavity of an individual and which aerosol contains particles of a food acid which is present in non-toxic amounts and capable of being inhaled, the particles being of a proper size and having the food acid sufficient in content to migrate to the respiratory tract and simulate the sensations in the respiratory tract caused by tobacco smoke, the size of the particles being established so that at least a moderately substantial portion of the particles remain in the upper respiratory tract, whereby the oral and respiratory tract sensations simulate those created by tobacco smoke to reduce the need of an individual for tobacco smoke.

4,715,388

CIGARETTES HAVING MINIMIZED LOOSE ENDS AND A PROCESS FOR PREPARING SAME

Norman B. Rainer, Richmond, Va., assignor to Philip Morris Incorporated, New York, N.Y.

Filed Jun. 20, 1985, Ser. No. 746,650
Int. Cl.[4] A24B *15/28, 15/42;* A24D *1/00*
U.S. Cl. 131—309 **10 Claims**

1. A method for treating tobacco materials to reduce the loss of said materials at the uncovered end of a cigarette comprising:

uniformly treating shredded tobacco materials with between about 1% and 6% by weight of a particulate hygroscopic adhesive powder,

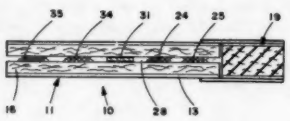
aging said treated shredded tabacco materials without compaction for a time sufficient to allow said powder to adhere to said tobacco materials.

4,715,389

CIGARETTE

Dwo Lynn; Carl C. Morrison, both of Winston-Salem, and Ronald W. Hutcherson, Sr., King, all of N.C., assignors to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Filed Sep. 15, 1986, Ser. No. 907,175
Int. Cl.[4] A24D *1/00*
U.S. Cl. 131—335 **9 Claims**



1. An improved cigarette affording an enhanced delivery of nicotine and a reduced delivery of particulate matter in the smoke which comprises a column of cigarette tobacco wrapped with cigarette paper, a plurality of segments of aluminum screen material axially aligned within the column of tobacco and a section of carbonized flue-cured tobacco stem material impregnated with nicotine axially aligned with said segments within said column of tobacco.

4,715,390

MATRIX ENTRAPMENT OF FLAVORINGS FOR SMOKING ARTICLES

Walt Nichols; Reggie Newsome, both of Richmond; Rich Thesing, Glenn Allen, and Willie Houck, Richmond, all of Va., assignors to Philip Morris Incorporated, New York, N.Y.

Filed Nov. 19, 1985, Ser. No. 799,750
Int. Cl.[4] A24B *3/12, 13/00*
U.S. Cl. 131—335 **30 Claims**

1. A composition capable of progressively releasing flavor in smoking articles upon contact with moisture-containing smoke comprising an admixture of:

a selected soluble flavoring material;

a solvent for said flavoring material;

a moisture releasing hydrophilic polymer; and

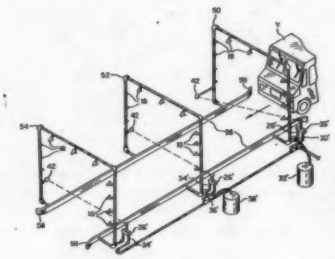
an amount of triacetin effective to retain the flavoring material in the composition.

4,715,391

APPARATUS FOR WASHING VEHICLES

James I. Scheller, 16742 S. Annette, Oregon City, Oreg. 97045

Continuation of Ser. No. 732,349, May 8, 1985, abandoned, which is a continuation of Ser. No. 523,373, Aug. 15, 1983, abandoned. This application Jul. 21, 1986, Ser. No. 888,736
Int. Cl.[4] B08B *3/02*
U.S. Cl. 134—57 R **1 Claim**



1. Apparatus for washing vehicles in a streak-free process, consisting essentially of

first, second and third arch-like body members each having top and side portions of height and width dimensions allowing a vehicle to move therethrough,

support and quide means secured to said arches to support them upright and also to guide a vehicle through the arches,

said three arches being spaced apart and in alignment with each other so that a vehicle can be driven therethrough,

conduit means and inwardly directed nozzles on the top and side portions of each arch,

first detergent means associated with said conduit means and nozzles of said first arch supplying an acidic detergent to said nozzles of said first arch in a pH range of 2 to 5 for initial washing of a vehicle,

second detergent means associated with said conduit means and nozzles of said second arch supplying an alkaline detergent to said nozzles of said second arch in a pH range of 10 to 13 for further washing a vehicle and neutralizing said acidic detergent,

water rinse means associated with said conduit means of said third arch supplying pressured water in a final step to said nozzles of said third arch for rinsing the detergents from the vehicle,

containers for each of said first and second detergent means having communication with said conduit means and nozzles,

electrically operated valved control means in said conduit means arranged to be energized at selected positions of a vehicle for sequential operation of said first detergent means, said second detergent means, and said water rinse means,

pressure means associated with said conduit means for pressurizing said first and second detergent means and rinse means,

and actuating means for said electrically operated valved control means.

4,715,392

AUTOMATIC PHOTOMASK OR RETICLE WASHING AND CLEANING SYSTEM

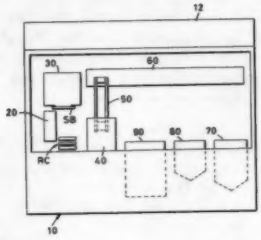
Nobutoshi Abe, Kawasaki, and Kazunori Imamura, Tokyo, both of Japan, assignors to Nippon Kogaku K. K., Tokyo, Japan

Continuation of Ser. No. 668,012, Nov. 5, 1984, abandoned. This application Feb. 4, 1987, Ser. No. 11,413

Claims priority, application Japan, Nov. 10, 1983, 58-211626; Nov. 18, 1983, 58-217434

Int. Cl.[4] B08B *3/02*

U.S. Cl. 134—62 **9 Claims**



1. A system for washing and cleaning the surfaces of a flat substrate horizontally encased in a case comprising:

means for inspecting foreign particles attached to the surface of said flat substrate, said inspecting means including first holder means for holding said flat substrate in a horizontal state;

means for washing the surface of said flat substrate so as to remove foreign particles attached to the surfaces of said flat substrate and including second holder means for holding said flat substrate in a vertical state and a washing unit for washing and cleaning the surface of said flat substrate held by said second holder means;

attitude change means for shifting the attitude of said flat substrate between the horizontal state and the vertical state;

first transfer means for withdrawing said flat substrate from said case and transferring said flat substrate to said second holder means through said attitude change means, the attitude of said flat substrate being changed from the horizontal state to the vertical state by said attitude change means;

second transfer means for transferring said flat substrate from said second holder means to said first holder means through said attitude change means, the attitude of said flat substrate being changed from the vertical state to the horizontal state by said attitude change means; and

third transfer means for transferring said flat substrate from said first holder means into said case.

4,715,393

FLUID DISPERSING CHECKVALVE

Gary D. Newton, 19473 County Rd. 35, Eckley, Colo. 80727

Filed Jul. 18, 1986, Ser. No. 887,886

Int. Cl.[4] F16K *19/00*

U.S. Cl. 137—7 **10 Claims**

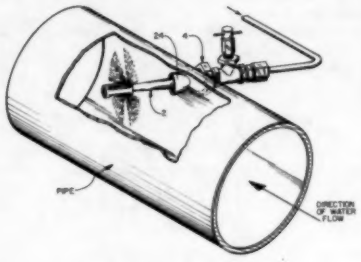
8. A method for dispersing a fluid in a liquid stream which comprises:

(a) flowing said fluid through a passage in a conduit;

(b) exiting said fluid from said passage through an orifice;

(c) displacing a valve from a valve seat circumscribing said orifice with said flow of fluid;

(d) urging said valve against a valve retainer to move said valve retainer longitudinally in a slotted housing in opposition to a spring means compressing said spring means; and



(e) passing said fluid past said valve and through slots in said slotted housing and dispersing said fluid into said stream flowing past and through said slotted housing.

4,715,394

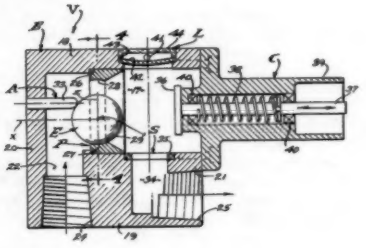
GAS SUPPLY SAFETY VALVE FOR EARTHQUAKE PROTECTION

Michael S. O'Donnell, 10823 Whittle St., No. 9, North Hollywood, Calif. 91602, and Robert R. Graham, 1079 E. San Jose Ave., Burbank, Calif. 91501

Filed Sep. 19, 1986, Ser. No. 910,232

Int. Cl.[4] F16K *17/36*

U.S. Cl. 137—38 **5 Claims**



1. A normally open safety valve sensitive to close in response to longitudinal, transverse and vertical accelerations and including;

a body having a flow chamber therein with an inlet opening and an outlet opening,

a valve seat at the outlet opening,

a pedestal means within the chamber and comprised of an upwardly disposed transversely arcuate groove of concaved cross sectional form having a rear edge and opposite side edges,

a ball valve normally set in a bottom dead center position of said groove and subject to accelerations of the body to roll by its inertia over any one of said edges,

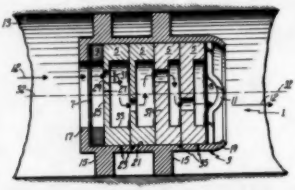
the valve seat being lower than said edges to receive the ball valve,

and an abutment means comprised of a horizontally disposed pin at the front side of the pedestal means on an axis substantially above the center of and engaged with the periphery of the ball valve in its normally set bottom dead center position to prevent forward displacement thereof and to cause rearward rolling thereof subject to vertical as well as longitudinal accelerations of the body.

4,715,395
FLUID FLOW REGULATOR

Roy J. Mainelli, West Hartford, Conn., and Donald Preston, Agawam, Mass., assignors to United Technologies Corporation, Hartford, Conn.

Filed Jun. 30, 1986, Ser. No. 880,601
Int. Cl.[4] F15D *1/02*
U.S. Cl. 138—42 **4 Claims**



4. An apparatus having a series of spaced orifices for controlling a flow of fluid therethrough each orifice having a length L and a diameter D, said fluid having a specific gravity S which varies linearly and inversely over a temperature range, said series of spaced orifices being characterized by:

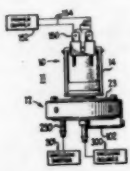
a first set of orifices, each of said first set of orifices having a first L/D ratio and a first discharge coefficient corresponding to said first L/D ratio, said first discharge coefficient varying non-linearly over a temperature range;

a second set of orifices, each of said second set of orifices having a second L/D ratio and a second discharge coefficient corresponding to said second L/D ratio, said second discharge coefficient varying non-linearly over a temperature range, said first L/D ratio and said second L/D ratio being dimensioned such that the first discharge coefficient relating to said first L/D ratio and said second discharge coefficient relating to said second L/D ratio coefficient offset changes to said specific gravity of said fuel over a temperature range thereby providing for a relatively constant flow of fuel over said temperature range.

4,715,396
PROPORTIONAL SOLENOID VALVE

Clarence D. Fox, Decatur, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.

Continuation of Ser. No. 645,191, Aug. 29, 1984, Pat. No. 4,534,375, which is a continuation of Ser. No. 349,488, Feb. 17, 1982, abandoned, which is a continuation-in-part of Ser. No. 311,820, Oct. 16, 1981, abandoned. This application Aug. 2, 1985, Ser. No. 761,906
The portion of the term of this patent subsequent to Jun. 11, 2002, has been disclaimed.
Int. Cl.[4] F16K *31/06*; F15C *3/00*
U.S. Cl. 137—82 **4 Claims**



1. An electromechanical valve assembly, comprising

an electrical winding;

a magnetic flux circuit defining a flux path comprising a plurality of adjacent magnetic segments, including a generally cylindrical center segment which defines a fluid passage, an outer segment, and an end segment adjacent one end of said fluid passage, at least one of said segments being physically translatable within said valve assembly along said flux path to adjust the portion of one of said segments that is in said flux path and the extent of an air gap adjacent the translatable segment;

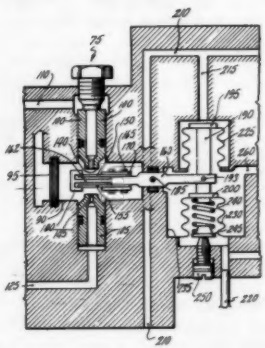
a non-magnetic seat member, having a central opening aligned with, and disposed near the other end of, the fluid passage; and

a magnetic closure member, positioned adjacent the non-magnetic seat and, with said magnetic segments, completing the flux path such that fluid flow urged by a predetermined pressure difference through the fluid passage and seat member central opening can be modulated by varying the energization level of the electrical winding, translation of the adjustable segment along said flux path being effective to vary the portion of one of said segments in said flux path and the air gap distance and thus vary the reluctance of the valve assembly for a given energization level of the electrical winding and given pressure difference.

4,715,397
PRESSURE REGULATOR

Charles F. Stearns, Longmeadow, Mass., assignor to United Technologies Corporation, Hartford, Conn.

Filed Aug. 6, 1984, Ser. No. 638,338
Int. Cl.[4] F15B *5/00*
U.S. Cl. 137—84 **4 Claims**



1. A flow control system comprising a fluid operated control device, the operation of said flow control system being at least in part, determined by the setting of said control device in response to a difference in pressure thereacross of control fluid supplied thereto from a source of said fluid, said flow control system including a pressure regulator characterized by:

first and second orifices providing at least in part, fluid communication between said control device and said fluid source, modulation of fluid flow through said orifices determining said pressure difference across said control device;

first and second flappers disposed adjacent said first and second orifices, respectively, for varying the effective cross-sectional area of said orifices, thereby modulating flow therethrough for control of said pressure difference across said control device, said flappers and orifices being subject to fouling by contamination therebetween;

a lever having opposite sides on which said first and second flappers are mounted for the simultaneous positioning thereof with a single mechanical input to said lever;

first and second stiffening means connected to said first and second flappers, respectively, at outer surfaces thereon, each of said stiffening means unidirectionally stiffening a corresponding flapper in a direction parallel to the direction of flow through a corresponding orifice to prevent said flow from mispositioning said flapper while allowing flexure of said corresponding flapper in an opposite direc-

tion for minimizing any impediment to the normal operation of the other flapper due to the fouling of said corresponding flapper; and

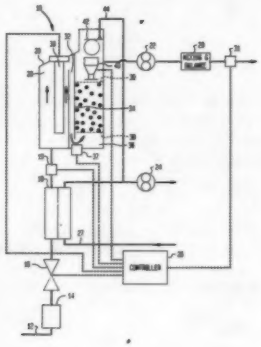
said stiffening means further comprising stops engageable with outer portions of the ends of said flappers for limiting the travel thereof in directions parallel to said directions of flow through said orifices.

4,715,398

LIQUID LEVEL CONTROL

David R. Shouldice, Lakewood, and Dennis M. Treu, Morrison, both of Colo., assignors to Cobe Laboratories, Inc., Lakewood, Colo.

Filed Oct. 30, 1986, Ser. No. 925,818
Int. Cl.[4] B01D *19/00*
U.S. Cl. 137—171 **15 Claims**



1. Fluid flow apparatus comprising

a housing defining a deaeration chamber, a chamber inlet and a chamber outlet for the flow of liquid therethrough, said housing having a gas outlet at its top for the removal of gas volatilized from said liquid,

a level sensor providing a control signal having a magnitude related to the level of liquid in said chamber,

a valve hydraulically connected to said chamber inlet to control flow into said inlet,

a pump connected to said chamber outlet,

a source of negative pressure connected to said gas outlet, and

a controller operably connected to alternately open and close said valve in a duty cycle responsive to the magnitude of said signal.

4,715,399

LIQUID-PROPELLANT MANAGEMENT SYSTEM FOR ROCKETS AND SPACE VEHICLES

Don E. Jaekle, Jr., 1042 Candlewood Ave., Sunnyvale, and R. K. Grove, 484 Panchita Way, Los Altos, both of Calif.

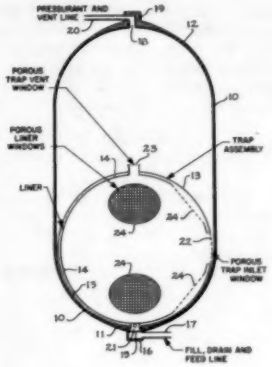
Filed Oct. 29, 1984, Ser. No. 665,657
Int. Cl.[4] B64G *1/00*
U.S. Cl. 137—209 **5 Claims**

1. An apparatus for providing substantially gas-free liquid propellant to an engine, said apparatus comprising:

(a) a hollow storage tank having a first opening and a second opening, said first opening being connectable to a first line through which said liquid propellant can be expelled from said tank to said engine, said second opening being connectable to a second line through which pressurized gas can be introduced into said tank to effect expulsion of said liquid propellant from said tank;

(b) a hollow trap positioned within said tank, said trap having a porous inlet window for said liquid propellant and an exit port for said liquid propellant, said trap being secured to said tank so that said exit port of said trap communicates with said first opening of said storage tank, said exit port of said trap being connectable to said first line; and

(c) a liner positioned within said trap, said liner being secured to said trap circumjacent said porous inlet window and circumjacent said exit port of said trap, said liner being spaced apart from said trap elsewhere within said trap to define a volume between said liner and said trap, said liner having a plurality of porous windows;



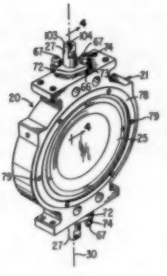
said porous inlet window of said trap and said porous windows of said liner having pores dimensioned to permit passage therethrough of said liquid propellant, said pores maintaining a barrier of said liquid propellant on said windows by surface tension when liquid propellant is not passing therethrough, said barrier precluding passage of said gas therethrough.

4,715,400

VALVE AND METHOD OF MAKING SAME

John F. Gardner, Loveland, and Thomas W. Showalter, Milford, both of Ohio, assignors to Xomox Corporation, Cincinnati, Ohio

Division of Ser. No. 473,555, Mar. 9, 1983, Pat. No. 4,559,967.
This application Dec. 23, 1985, Ser. No. 812,231
The portion of the term of this patent subsequent to Dec. 24, 2002, has been disclaimed.
Int. Cl.[4] F16K *49/00, 1/22*
U.S. Cl. 137—341 **9 Claims**



1. In a fluid control butterfly valve comprising, a valve body structure having a fluid flow passage therethrough and first substantially annular sealing surface means around the periphery of said passage, and a rotatable closure structure for controlling fluid flow through said passage, said closure structure having second substantially annular sealing surface means around its periphery adapted to engage said first sealing surface means to shut off fluid flow through said valve, the im-

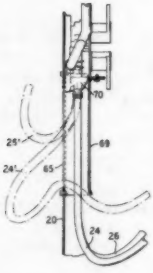
provement comprising substantially annual heat exchange means carried entirely by one of said structures and operating independently of the other of such structures, said annular heat exchange means corresponding in outline to and being disposed immediately adjacent yet in radially spaced relation with respect to an associated sealing surface means for controlling the temperature of at least its respective said associated sealing surface means, said substantially annular heat exchange means comprising electrical means, said substantially annular heat exchange means comprising substantially annular groove means in said one structure, said electrical means being disposed in said groove means, and further comprising an annular plate fastened over said annular groove means to hold said electrical means therein.

4,715,401

HOSE STORAGE ACCESS MEANS FOR SHIPMENT OF APPLIANCE

Paul R. Staun, St. Joseph Township, Berrien County; Robert M. Weir, St. Joseph, both of Mich., and Dean R. Sommerfeld, Green Springs, Ohio, assignors to Whirlpool Corporation, Benton Harbor, Mich.

Filed Dec. 30, 1986, Ser. No. 947,650
Int. Cl.[4] A62C *35/00*
U.S. Cl. 137—355.17 **16 Claims**



1. A cabinet for an appliance wherein the appliance has at least one hose with a free end to be attached to a conduit external of the cabinet, and the hose is stored internally of the cabinet during assembly and shipping of the appliance, comprising:

an access port through said cabinet providing access to at least a portion of said hose;

connecting means mounted onto an interior portion of said cabinet adjacent to said access port for attaching a fixed end of said hose to said appliance said fixed end of said hose attached to said connecting means, the free end of said hose being stored internally of said cabinet inaccessible from said port;

whereby selective removal of said free end of said hose from within said cabinet may be effected by grasping said accessible portion of said hose.

4,715,402

SHIPMENT HOSE STORAGE FOR APPLIANCES

Paul R. Staun, St. Joseph Township, Berrien County, and James R. Mulder, Berrien Township, Berrien County, both of Mich., assignors to Whirlpool Corporation, Benton Harbor, Mich.

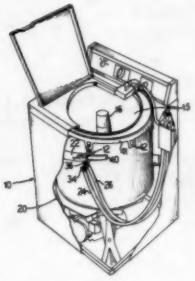
Filed Dec. 30, 1986, Ser. No. 947,649
Int. Cl.[4] A62C *35/00*
U.S. Cl. 137—355.17 **15 Claims**

1. A hose retainer for selectively removably securing free ends of a plurality of hoses to the interior of an appliance cabinet comprising:

an elongated flexible sheet-form member sized and split to form a frangible hook for suspending the hose retainer to the interior of the appliance cabinet;

said member having a slit for removably receiving a free end of a first hose; and

engagement means for securing a free end of at least one second hose;



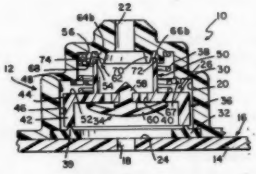
whereby, a deliberate induced action by an operator on said first hose will cause said first hose to be pulled out of said slit and a deliberate operator induced tearing action on said second hose will cause said hook to tear.

4,715,403

FLOW CONTROL VALVE

Emil Szlaga, Connersville, Ind., assignor to Stant Inc., Connersville, Ind.

Filed Nov. 28, 1986, Ser. No. 935,814
Int. Cl.[4] F16K *17/26, 24/00*
U.S. Cl. 137—493.2 **5 Claims**



1. A flow-metering pressure-relief valve assembly for vehicle fuel tanks and the like, the assembly comprising

a valve housing having an interior wall configured to define a chamber, inlet opening means for admitting fuel vapor into the chamber, and outlet opening means for exhausting fuel vapor from the chamber, the interior wall providing a first flow-metering surface situated in close proximity to the outlet opening means,

a valve seat attached to the valve housing and situated in the chamber to surround the inlet opening means,

a pressure-relief element in the chamber, the pressure-relief element including a valve member having a inner surface confronting the inlet means, and an upstanding skirt attached to the valve member and having a distal portion extending in an outward direction toward the outlet means in spaced relation to the interior wall of the valve housing, the distal portion providing a second flow-metering surface which cooperates with the first flow-metering surface to define a variable flow-metering orifice therebetween, and

biasing means for yieldably biasing the valve member against the valve seat normally to close the inlet opening means, the second flow-metering surface being moved in relation to the first flow-metering surface in response to relative movement of the valve member and the valve seat to vary the size of the variable flow-metering orifice, the first and second flow-metering surfaces having predetermined

shapes that are configured to meter the flow of pressurized fuel vapor through the variable flow-metering orifice in accordance with a predetermined specification matching the flow rate of fuel vapor exhausted through the outlet opening means to the magnitude of the pressure exposed to the inner surface of the valve member wherein the valve housing has a longitudinal axis and includes

a first baffle depending from the interior wall and extending into the chamber in an axially-inward direction toward the valve member, the first baffle having a radially inwardly-facing surface, and

a second baffle depending from the interior wall and extending into the chamber in an axially-inward direction toward the valve member, the first and second baffles being situated in radially spaced-apart relation to receive the distal portion of the upstanding skirt therebetween, the second baffle having a radially outwardly-facing surface which cooperates with the radially inwardly-facing surface of the first baffle to provide the first flow-metering surface.

4,715,404

ARRANGEMENT FOR DISASSEMBLING SEALING AND BEARING MEANS FROM ROTARY PIPE JOINTS

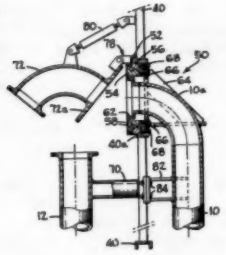
Joel Fusy, Barrault, France, assignor to FMC Corporation, Chicago, Ill.

Filed Jan. 17, 1986, Ser. No. 820,476

Claims priority, application France, Jan. 17, 1985, 8500659

Int. Cl.[4] F16L *27/00*

U.S. Cl. 137—615 **14 Claims**



1. A loading arm, for transferring liquids, gases and particulate solids, comprising:

(a) a generally upstanding riser;

(b) an inner arm section pivotally mounted on the riser;

(c) an outer arm section;

(d) a rotary pipe joint pivotally interconnecting and removably attached to said inner and outer arm sections, said pipe joint comprising annular inner and outer elements interconnected for relative rotation by bearing means; and

(e) arm section support means attached to and extending from one of said arm sections and releaseably attachable to the other arm section for rigidly interconnecting and supporting said arm sections in an arm-assembled position while the rotary pipe joint is removed from the arm.

4,715,405

SOLENOID VALVE, PARTICULARLY FOR APPARATUS FOR REMOVING A MILKING SET

Jan Kummer, Leeuwarden, Netherlands, assignor to Kummer Electronics B.V., Leeuwarden, Netherlands

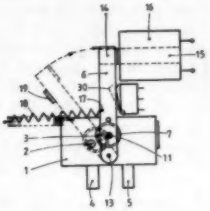
Filed Mar. 20, 1987, Ser. No. 28,258

Claims priority, application Netherlands, Mar. 27, 1986, 8600802

Int. Cl.[4] F16K *11/074, 15/18, 31/02*

U.S. Cl. 137—625.2 **7 Claims**

1. A valve for opening and closing respectively the communication between at least two fluid carrying conduits in which different pressures prevail, said valve having a valve body connected to a valve carrier and which is movable into two positions, the valve carrier being under the influence of a spring and carrying a permanent magnet which in the one valve position is retained by the soft iron core of the solenoid, the coil of the solenoid being adapted to be supplied with a current pulse, so that the solenoid repulses the permanent magnet, so that under the influence of the spring the valve carrier is moved against an abutment in the other valve position, characterized in that the valve (7) is a three-way valve and the valve carrier (7) is adapted to be moved by hand (22) against the force of the spring (18) into the closed valve position, in which the permanent magnet (14) is retained under the



influence of the soft iron core (15) of the solenoid (15, 16), the fluid conduits (4, 5) opening into apertures (2, 3) in a planar surface of a connection block (1) and the valve body (7) being cup shaped of such dimensions and shape that it mutually communicates in the other valve position the outlet apertures (2, 3) while sealing with the planar surface, the valve carrier being a lever (6), which is rotatable around a pivot (13) provided in the connection block (1), the valve body (7) being secured to said lever adjacent to its pivot (13), the permanent magnet (14) being secured to the end of the lever (6) which is remote from the pivot (13).

4,715,406

CONTROL DISC VALVE

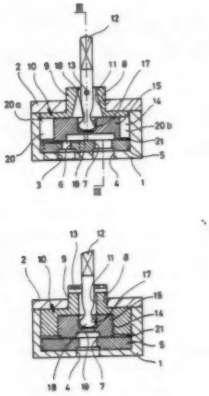
Hermann Kress, Filderstadt, Fed. Rep. of Germany, assignor to Hansa Metallwerke AG, Fed. Rep. of Germany

Filed Jun. 25, 1986, Ser. No. 878,243

Claims priority, application Fed. Rep. of Germany, Jul. 5, 1985, 3524149

Int. Cl.[4] F16K *11/078, 31/72*

U.S. Cl. 137—625.17 **15 Claims**



1. A control disc valve arrangement comprising in combination

(a) a housing,

(b) a stationary control disc fixedly positioned within said

housing and being in the form of a flat planar member having inlet ports located therein for the introduction of fluids from outside said housing, and at least one outlet port located therein which is adapted for the exit of fluids introduced through said inlet ports,

(c) a movable control disc movably positioned within said housing and being in the form of a flat planar member having one surface adapted to slide back and forth relative to one flat surface of said stationary control disc,

(d) a passageway in said movable control disc that is capable of controlling the flow of fluid between said inlet ports and said outlet port depending upon the position of said movable control disc with respect to said stationary control disc,

(e) a closed chamber surrounding the perimeter of said movable control disc in such a manner that the movable control disc separates said closed chamber into two spaced apart smaller chambers in the manner of a piston,

(f) a displacement path connecting said two smaller chambers, the cross-sectional area of said path being small in comparison to the cross-sectional area of either of said smaller chambers,

(g) a fluid substance filling the space in said closed chamber that is not occupied by said movable control disc, and

(h) means for moving said movable control disc from one position to another to thereby control the flow of fluid from said inlet ports to said outlet port whereby the movement of said movable control disc changes the relative volumes of said two spaced apart smaller chambers and such movement is slowed while said fluid substance in said closed chamber is forced from one smaller chamber to the other smaller chamber through said displacement path by virtue of the piston-like action of said movable control disc.

4,715,407

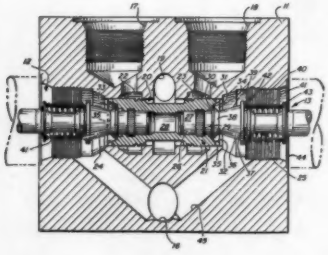
SPOOL VALVE ASSEMBLY

Felix Aranovich, Skokie, Ill., assignor to Clevite Industries Inc., Glenview, Ill.

Filed Oct. 14, 1986, Ser. No. 918,237

Int. Cl.[4] F15B *13/044*

U.S. Cl. 137—625.65 **16 Claims**



1. In a fluid flow control valve having a block defining a spool valve chamber, and ports communicating with said chamber, an improved spool valve assembly comprising:

a tubular spool having an axial bore defining an end portion, and an annular end provided with at least one axially outwardly opening notch;

a spool end having an inner end portion fixedly secured to said spool in said bore end portion, an intermediate portion defining a first, frustoconical axially outwardly narrowing radially outer surface concentrically within said annular end of the spool, and a second, frustoconical, axially outwardly widening radially outer surface extending axially outwardly from the axially outer end of said first frustoconical surface and axially outwardly of said spool annular end, said outer surface facing substantially directly toward one of said block ports; and

means for selectively positioning the spool in said chamber.

4,715,408

GAUZE OR LENO HARNESS FOR WEAVING MACHINES

Franz Eisenlohr, Im Bühl, Tuttwil, Switzerland

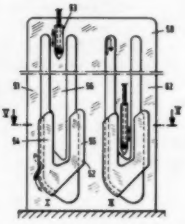
PCT No. PCT/CH86/00116, § 371 Date Jan. 20, 1987, § 102(e) Date Jan. 20, 1987, PCT Pub. No. WO87/01398, PCT Pub. Date Mar. 12, 1987

PCT Filed Aug. 11, 1986, Ser. No. 15,860

Claims priority, application European Pat. Off., Sep. 2, 1985, EP85111068.4

Int. Cl.[4] D03D *47/40*

U.S. Cl. 139—54 **13 Claims**



8. A leno harness for a weaving machine comprising

a frame-like carrier having a central web, a pair of lanes on opposite sides of said web for guiding a crossing yarn therein and a passage having an inclined base connecting said lanes with each other for guiding the crossing yarn therebetween;

a guide for a standing yarn mounted centrally of said lanes for reciprocating movement relative to said web during a shed change; and

a guide element having a pair of arms extending about said web with a clearance at least equal to the thickness of the crossing yarn and with each arm disposed in a respective lane, and a yoke interconnecting said arms and resting on said base.

4,715,409

DEVICE FOR COUPLING A HEDDLE FRAME WITH A DRIVING ELEMENT

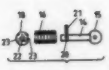
Martin Graf, Horgenberg, Switzerland, assignor to Grob & Co. Aktiengesellschaft, Horgen, Switzerland

Filed Nov. 5, 1986, Ser. No. 927,165

Claims priority, application Fed. Rep. of Germany, Nov. 19, 1985, 3541042

Int. Cl.[4] D03C *13/00*

U.S. Cl. 139—88 **7 Claims**



1. A device for coupling a heddle frame with an oscillatory drive element comprising, a pair of coupling elements which are engageable one into the other and which, in use, are respec-

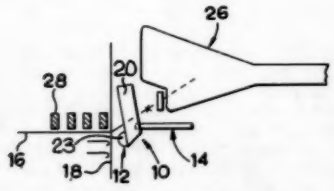
tively disposed on a frame stave of said heddle frame and on said oscillatory drive element, a bolt latch comprising a pivotally mounted part of one of the coupling elements and being capable of pressing against the other coupling element when the coupling elements are engaged, the bolt latch having wedge surfaces extending transversely to the direction of drive and arranged to co-operate with matching surfaces on the other coupling element when the latch is pressed against it to produce a positive locking of the coupling elements in the engaged position, a toggle lever hinged to the bolt latch for operating the bolt latch and being pivotally mounted on said one coupling element, said toggle lever being pivotable against the action of a compression spring into an over dead center position in which the bolt latch is in the locking position, the toggle lever comprising an operating lever and a lever element interconnected by a joint, the lever element being hinged at one end to the bolt latch, and the compression spring abutting on said joint and on the end of the lever element which is connected to the bolt latch.

4,715,410

WEAVING LOOM

John D. Griffith, Cleadon, England, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Sep. 16, 1986, Ser. No. 908,044
Int. Cl.[4] D03D *47/48*
U.S. Cl. 139—434 **5 Claims**



1. Apparatus for turning a weft yarn into a warp shed for creating of a selvedge, the apparatus including a movable guide which in a first position is located outside the warm sheet to receive the end of the weft yarn after weft insertion, said guide being movable to a second position located within the warp shed so that said guide serves to separate the upper and lower warp threads adjacent the fell of the warp shed prior to turning in of the weft yarn end and to thereby prevent snagging of the end of the weft yarn on the upper and lower warp threads, and a fluid jet nozzle associated with said guide, said jet nozzle being positioned to direct a flow of fluid along said guide for carrying the end of the weft yarn into the warp shed and through said guide after said guide has moved to said second position.

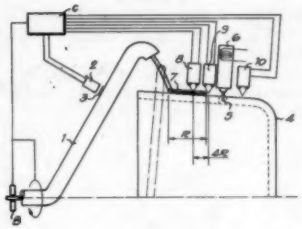
5. A method of turning the end of a weft yarn into a warp shed for creation of a selvedge, the method including receiving the end of a weft yarn protruding from the warp sheet in a movable guide, after beat-up moving the guide into the newly formed warp shed to separate the upper and lower warp threads adjacent the fell of the warp shed prior to turning in of the weft yarn end and to thereby provide a passageway for the end of the weft yarn, directing a flow of fluid along the passageway to move the end of the weft yarn into the warp shed and through the passageway provided by the inwardly moved guide to prevent snagging of the end of the weft yarn on the upper and lower warp threads, removing the guide from the warp shed while maintaining said flow of fluid for maintaining the end of the weft yarn in position until beat-up of the subsequently inserted weft yarn.

4,715,411

SPEED CONTROL FOR WEFT FEED SPOOL IN WEAVING LOOMS

Philippe Van Bogaert, Brussels, and Filip Deconinck, Zwevegem, both of Belgium, assignors to Picanol N.V., Belgium

Filed Aug. 13, 1985, Ser. No. 765,221
Claims priority, application Belgium, Sep. 4, 1984, 2/60490
Int. Cl.[4] D03D *47/36*; B65H *51/20*
U.S. Cl. 139—452 **8 Claims**



1. A method for controlling the speed of a weft feed spool in a weaving loom comprising:

detecting at least two items of data related to weft delivery and supply, and loom operation;

detecting by a weft reserve sensor the average minimum desired length of weft reserve on the spool;

calculating from the detected data the variation from the average minimum desired reserve in terms of number of windings on the spool;

calculating, as a function of the calculated variance in the number of windings from the average minimum reserve, any adjustment needed to the speed of the weft feed spool;

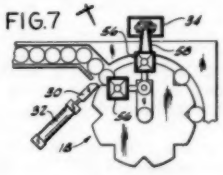
controlling the weft feed spool speed as a function of said calculated adjustment.

4,715,412

METHOD AND APPARATUS FOR CHECK-WEIGHING CHARGES FOR CONTAINERS

Nicholas J. Perazzo, Green Bay, Wis., assignor to Bemis Company, Inc., Minneapolis, Minn.

Filed Aug. 22, 1985, Ser. No. 768,205
Int. Cl.[4] B65B *1/32, 1/28*
U.S. Cl. 141—1 **15 Claims**



4. Apparatus for filling a sequential supply of containers with charges of product while intermittently checking the weight of selected charges, comprising:

conveyor means for conveying a sequential supply of containers in at least one row and in predetermined spaced relation;

container filling means disposed adjacent the conveyor means for delivering a measured charge of product to each container as the container is conveyed by said conveyor means past said container filling means;

product weighing means disposed adjacent the filling means for receiving therefrom a charge of product which otherwise would have been delivered to a container;

means upstream of the filling means for creating a space on the conveyor means at a location for a container corresponding to the charge weighed by the weighing means; and

means for diverting to said weighing means the charge which otherwise would have been delivered to said space.

4,715,413

APPARATUS FOR MANIPULATING SMALL VOLUMES OF LIQUID

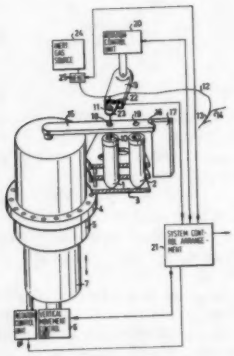
Ulf E. H. H. Backlund, Tolvmansvägen 27, S-191 71 Sollentuna, and Carl U. Ungerstedt, Mjölnarstigen 11, S-181 46 Lidingö, both of Sweden

Filed Oct. 8, 1986, Ser. No. 916,634

Claims priority, application Sweden, Oct. 18, 1985, 8504910

Int. Cl.[4] B65B *3/04*

U.S. Cl. 141—94 **7 Claims**



1. Apparatus for manipulating a small quantity of liquid, comprising at least one vessel for accommodating said quantity of liquid, a cannula suspension arrangement having a cannula capable of being inserted into said vessel, and a control arrangement which positions the cannula in the bottom of the vessel, the cannula suspension arrangement including a pressure sensor which is coupled to the control arrangement and which acts on the control arrangement when the tip of the cannula is subjected to a force acting axially to the cannula above a given level to stop further insertion of the cannula into the vessel.

4,715,414

CONCENTRIC WELL-TYPE EXTRACTOR TUBE FOR FILLING CONTAINERS WITH PRESSURIZED FLUID

David C. Harrison, Emmer Green, and Brian Glover, Camperley, both of England, assignors to Grundy Dispense Systems, Inc., Canoga Park, Calif.

Continuation-in-part of Ser. No. 700,085, Feb. 11, 1985, abandoned. This application Oct. 15, 1986, Ser. No. 919,314

Int. Cl.[4] F16L *37/12;* **B65B** *3/18*

U.S. Cl. 141—302 **20 Claims**

1. An extractor tube assembly for use with a container which includes sidewalls, comprising:

a. a valve neck for attaching said extractor tube assembly to the container, said valve neck comprising an upper and lower surface;

b. a valve body retained within said valve neck;

c. a valve housing member attached to said valve body adjacent to the lower surface of said valve neck, said valve housing member depending from said valve body and including a depending basket portion having at least one opening therein;

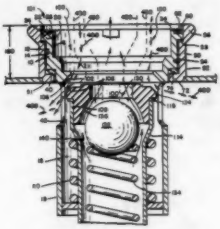
d. a first valve assembly including a first valve seat and a movable first valve member, both seated within said valve body;

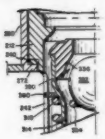
e. an elongated siphon tube attached to said moveable first valve member;

f. retaining means for retaining said moveable first valve member against said first valve seat to maintain said first valve assembly in a normally closed position;

g. a second valve assembly seated within said first valve assembly;

h. said elongated siphon tube further comprising an elongated cylindrical portion and a widened neck portion at the top of said elongated siphon tube; and





i. deflector means comprising a deflector plate retained between said widened neck portion of said elongated siphon tube and said retaining means;

j. whereby when said first valve assembly is in an opened position, a flow path for fluid is defined such that fluid enters the extractor tube assembly, travels in the flow path defined between said first valve seat and said first valve member, is deflected by said deflector means and then travels directly out said at least one opening in said depending basket portion of said valve housing member and against said sidewalls of the container and thereafter into the container.

4,715,415

MOULDING ROUTING APPARATUS

M. Bosley Wright, 2501 Greenspring Valley Rd., Owings Mills, Md. 21117

Continuation of Ser. No. 719,770, Apr. 4, 1985, Pat. No. 4,632,160. This application Dec. 22, 1986, Ser. No. 944,180

The portion of the term of this patent subsequent to Dec. 30, 2003, has been disclaimed.

Int. Cl.[4] B27C *5/00*

U.S. Cl. 144—136 R **9 Claims**

1. In apparatus for cutting an insert groove in a longitudinally elongated moulding having a backside and mitred end, the combination comprising:

(a) a first base, and a first guide surface on the base to engage the back side of the moulding thereby to position the moulding directionally laterally, and to extend directionally longitudinally,

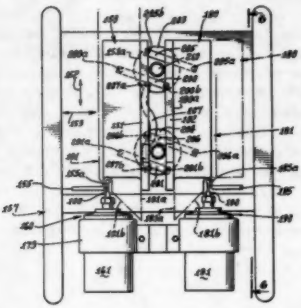
(b) a first stop to engage and position the mitred end of the moulding, thereby to position the moulding longitudinally,

(c) clamp means movable to engage the positioned moulding and retain the moulding on the base,

(d) a first router and a rotary drive therefor, the router projecting into lapping relation with said mitred end of the moulding,

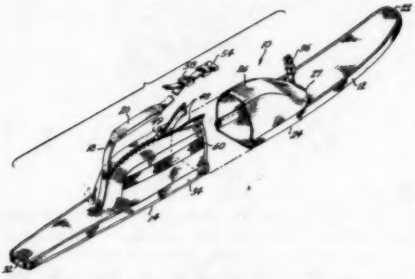
(e) and means to guide bodily displacement of the first rotat-

ing router relative to the base to directionally engage and penetrate the mitred end of the moulding, thereby to



produce said groove, the router thereafter being sidewardly removable from said groove.

4,715,416
SKI COVER
Kenneth A. Horne, Bainbridge Island, Wash., assignor to Connelly Skis, Inc., Lynnwood, Wash.
Continuation of Ser. No. 794,654, Nov. 4, 1985, abandoned. This application Mar. 3, 1987, Ser. No. 21,605
Int. Cl.[4] A63C *11/00*; B65D *37/00, 65/02*
U.S. Cl. 150—52 R **6 Claims**



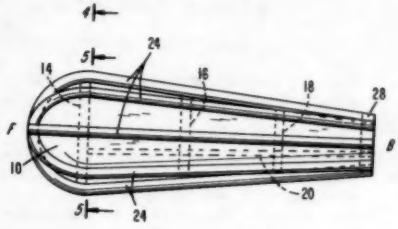
1. A ski cover comprising:

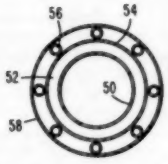
(a) an elongate first sleeve having a closed end and an open end, the first sleeve being formed from flexible material and adapted to slide over a first end of a ski such that said closed end is adjacent said first end of said ski, the open end of the first sleeve being enlarged relative to the remaining portion of the first sleeve;

(b) an elongate second sleeve having a closed end and an open end, the second sleeve being formed from flexible material and adapted to slide over a second end of said ski such that said closed end of said second sleeve is adjacent the second end of said ski, the open end of the second sleeve being enlarged relative to the remaining portion of the second sleeve, the ski cover being configured so that when the first and second sleeves are slid over their associated ski ends the enlarged portion of one of the sleeves slidably overlaps the enlarged portion of the other sleeve thereby to adjust the length of the ski cover to the length of the ski being carried within the cover whereby the closed end of the first sleeve is positioned against the first end of the ski and the closed end of the second sleeve is positioned against the second end of the ski; and,

(c) strap means interconnected between both sleeves for securing the overlapping first and second sleeves together such that when the ski cover, with the ski contained therein, is held by the strap means, the strap means applies a load on each sleeve in a direction toward the other sleeve thereby tending to maintain the closed ends of the sleeves positioned against corresponding ends of the ski.

4,715,417
AIRCRAFT FUEL TANK
Wayne H. Coloney, P.O. Box 668, Tallahasse, Fla. 32302
Filed Aug. 20, 1986, Ser. No. 898,426
Int. Cl.[4] B65D *90/12, 8/14*; B64D *37/04*
U.S. Cl. 150—55 **5 Claims**





1. A fuel tank adapted for mounting on the exterior of an aircraft comprising in combination

(a) a liquid fuel chamber constructed of a flexible liquid-impervious memberane and in the general shape of an elongated tear drop or other suitably aerodynamic shape,

(b) at least one passageway for the introduction or removal of liquid from said fuel chamber,

(c) a plurlaity of inflatable ribs attached to the outside walls of said liquid fuel chamber, said ribs

(1) being composed of tubes of flexible material that can be inflated with gas or liquid,

(2) being connected to means for inflating and deflating said tubular inflatable ribs.

(3) being attached to said flexible liquid-impervious membrane in a pattern at spaced apart intervals extending from the front portion to the rear portion of said fuel tank that, when said tubular ribs are inflated with a gas or liquid, will result in a strong supporting framework that establishes the maximum volumetric configuration and shape of said flexible liquid-impervious membrane and will cause it to be structurally strong enough to maintain its aerodynamic shape and qualities during flight at very high speeds, whether it is empty or filled with fuel, and configured in such a manner that when empty and demounted from the aircraft the ribs may be de-inflated, thus permitting the liquid fuel chamber to be collapsed to an essentially flattend condition that may be folded or rolled into a compact unit that occupies much less space than said maximum volumetric configuration, and

(d) an outer envelope of flexible material surrounding said plurality of inflatable ribs, said outer envelope being parallel to and spaced outwardly from said liquid fuel chamber.

4,715,418

PNEUMATIC TIRES HAVING HIGH UNIFORMITY

Shoji Miyoshi, Osaka, and Ryuichi Nomura, Hyogo, both of Japan, assignors to Toyo Rubber Industry Co., Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 620,523, Jun. 12, 1984, abandoned, which is a continuation of Ser. No. 354,517, Mar. 3, 1982, abandoned. This application Jun. 17, 1985, Ser. No. 744,896

Claims priority, application Japan, Mar. 4, 1981, 56-30646

Int. Cl.[4] D02G 3/48

U.S. Cl. 152—451 3 Claims

1. A pneumatic tire cord produced according to a method including the following steps:

(a) spinning polyester into a filament under tension at the solidifying point of melt polyester between 1.5×10^7 and 7.5×10^7 dyne/cm^2 and at a winding speed of 1,000 to 3,000 m/min.;

(b) drawing the polyester into a filament at a draw ratio of 2.0 to 3.0;

(c) twisting a plurality of the polyester filaments into a strand and twisting a plurality of said strands into a cord; and

(d) heat treating the polyester cord,

wherein the filament has an ethylene terephthalate component of at least 85 mol %, a high degree of polymerization such that the intrinsic viscosity is greater than 0.8 and a ratio of the birefringence of the surface portion to that of the central portion from 1.03/1 to 1.15/1, and the cord has a twist coefficient in the range of from 800 to 2,500, and a dimension unstabilizing factor 8.5 or less,

wherein the twist coefficient is equal to $T\times\sqrt{D}$, T being the average value between the number of turns of a first twist of the plurality of filaments into the strand and the number of turns of a final twist of the plurality of strands into the cord, each being per 10 cm of cord, and D being the denier of the cord, and

wherein the dimension unstabilizing factor is defined as the sum of the elongation (%) at a load of 2.3 g/d and the thermal shrinkage (%) when heated at 150° C. in dry air for 30 minutes.

4,715,419

LARGE-SIZE PNEUMATIC RADIAL TIRE FOR USE ON ROUGH ROAD WITH BELT HAVING SPECIFIED CORD

Kiyohito Kawasaki; Michitaka Sato, both of Akigawa; Hiroyuki Koseki, Ohmiya, and Tamotsu Matsunuma, Urawa, all of Japan, assignors to Bridgestone Corporation, Tokyo, Japan

Filed Nov. 28, 1984, Ser. No. 675,591

Claims priority, application Japan, Nov. 28, 1983, 58-222212

Int. Cl.[4] B60C 9/00; D07B 1/06

U.S. Cl. 152—527 7 Claims

1. A large-size pneumatic radial tire for use on rough road comprising as a tire reinforcement; a carcass ply of cords arranged in a direction substantially perpendicular to the equatorial plane of the tire and a belt composed of at least three cord layers each containing steel cords embedded parallel to each other in rubber and arranged at a relatively small angle with respect to the equatorial plane of the tire, at least two adjacent cord layers of said cord layers of the belt being piled one upon the other to cross their cords with each other at an angle of 15°-30° with respect to the equatorial plane, an outermost cord layer for said belt comprising a cord layer formed by embedding a plurality of twisted steel cords, each having an elongation at break of 3.0–5.5% and a single layer construction of 1×3, 1×4, or 1×5 or a double layer construction with a core of 1 to 2 filaments obtained by twisting plural steel filaments shaped prior to the formation of cord at a twisting angle of 10–20 without a wrap filament in rubber at a cord volume fraction of 5–40%, which is expressed by a percentage of the sum of sectional areas of cords included in an area of a region defined by a bisector between a line passing through centers of the cords in the outermost cord layer for the belt and a line passing through centers of the cords in an inner cord layer adjacent to the outermost cord layer and borderline between the tread and the outermost cord layer in section perpendicular to the circumferential direction of the belt, in such a manner that the form of penetrating rubber into the inside of the cord is a sealing type penetration from wherein a portion of the cord having an inner space completely filled with the penetrated rubber and a longitudinal length l_1 is alternately connected with a portion of the cord having an inner space incompletely filled with the penetrated rubber and a longitudinal length l_2 in the longitudinal direction of the cord so as to satisfy l_2 of not more than 10 mm and l_1/l_2 of not less than 0.14.

4,715,420

PNEUMATIC TIRE FOR PASSENGER CAR

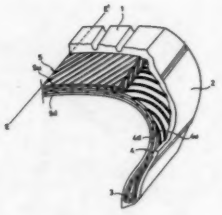
Kazuyuki Kabe, and Tuneo Morikawa, both of Hiratsuka, Japan, assignors to The Yokohama Rubber Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 609,118, May 11, 1984. This application Jun. 4, 1986, Ser. No. 873,092

Claims priority, application Japan, Jun. 13, 1983, 58-104263

Int. Cl.[4] B60C 9/06

U.S. Cl. 152—557 2 Claims



1. In a pneumatic tire of the type comprising a pair of right and left beads, a pair of right and left side walls containing said beads, respectively, a tread interposed between said side walls, a carcass cord layer spread between said beads, and at least two layers consisting of a belt reinforcing layer having reinforcing cords having a cord angle of from 15° to 30° with respect to the circumferential direction of the tire and a belt reinforcing layer having reinforcing cords having a cord angle of from 150° to 165° with respect to the circumferential direction of the tire, said belt reinforcing layers being laminated and disposed between said tread and said carcass cord layer, and said carcass cord layer having a two-layered laminate structure consisting of upper and lower carcass cord layers with each layer having reinforcing cords, the angle of said reinforcing cords of each of said carcass cord layers with respect to the circumferential direction of the tire, when measured from the side in which the angle of the reinforcing cords of said belt reinfcrcing layer on the contact side with said carcass cord layer describes an acute angle with respect to the circumferential direction of the tire, is such that the mean value $\frac{1}{2}(\alpha_1+\alpha_2)$ of the angle α_2 of the reinforcing cords of said upper carcass cord adjacent said belt reinforcing layer and the angle α_1 of the reinforcing cords of said lower carcass cord layer is from 96° to 108° and their difference $(\alpha_2-\alpha_1)$ is from 10° to 40°, and said upper carcass cord layer comprising reinforcing cords of nylon fibers and said lower carcass cord layer comprising reinforcing cords of polyester fibers with tension of said cords of both upper and lower carcass cord layers being substantially uniform.

4,715,421

ROLLER SHUTTER WITH JALOUSIE-TYPE LOUVERS

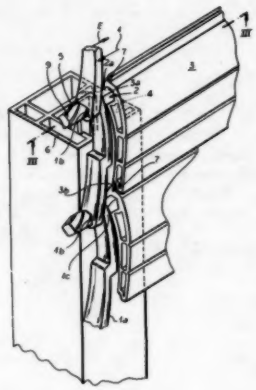
Günther Erber, Völkermarkterstr. 355, A-9020 Klagenfurt, Austria

Filed May 15, 1985, Ser. No. 734,398

Claims priority, application European Pat. Off., Oct. 25, 1984, 84890199.7

Int. Cl.[4] E06B *9/08*

U.S. Cl. 160—133 16 Claims



1. A roller shutter comprising:

an array of louvers each formed with bearing-pin members projecting from opposite ends of each louver and defining a pivot axis for the respective louver in a longitudinal direction thereof;

respective chains flanking said louvers and having links receiving said bearing-pin members, each of said bearing-pin member cooperating with a respective journal member, each journal member and the respective bearing-pin member being provided with mating screw formations; and

means for shifting at least one of said chains in said direction linearly so as to cause relative movement of the respective journal member and the respective bearing-pin member so as to swing said louvers about the respective axes between open and closed louver positions.

4,715,422

REINFORCEMENT OF ARTICLES OF CAST METAL OR METAL ALLOY

Norman Tommis, Bradford, and James A. Cooper, Lutterworth, both of England, assignors to AE PLC, Warwickshire, England

Continuation-in-part of Ser. No. 653,219, filed as PCT GB84/00009 Jan. 16, 1984, published as WO84/02927 on Aug. 2, 1984, abandoned. This PCT application Jan. 16, 1984, Ser. No. 852,099

Claims priority, application United Kingdom, Jan. 18, 1983, 8301320

Int. Cl.[4] B22D *19/14*

U.S. Cl. 164—97 8 Claims

1. A method of manufacturing a reinforcement for incorporation in a cast article of metal or metal alloy, and comprising:

milling fibres or whiskers,

dispersing a mass of milled fibres or whiskers in a solution of colloidal silica,

adding starch to the dispersed milled fibres or whiskers in said colloidal silica solution to prevent settling,

adding latex to the dispersed milled fibres or whiskers in said colloidal silica solution,

precipitating said latex to bend the milled fibres or whiskers together,

forming a compact of said latex bound milled fibres or whiskers,

drying the compact, and

firing the compact to disperse the latex and to leave the milled fibres or whiskers of the compact bound together, by said silica.

8. A method of manufacturing a piston for an internal combustion engine comprising:

placing in a casting mould a reinforcement according to claim 1,

introducing into said mould under gravity a molten material selected from aluminium or an aluminium alloy,

closing said mould,

applying pressure to said molten material to force said molten material into said reinforcement,

solidifying said molten metal under said pressure to form said piston.

4,715,423

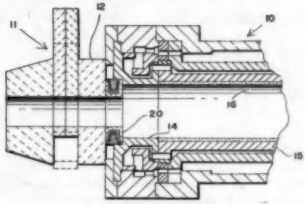
COMPOSITE BREAK RING METHOD

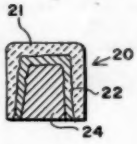
Patrick D. King, Rantoul, Ill., assignor to Flo-Con Systems, Inc., Champaign, Ill.

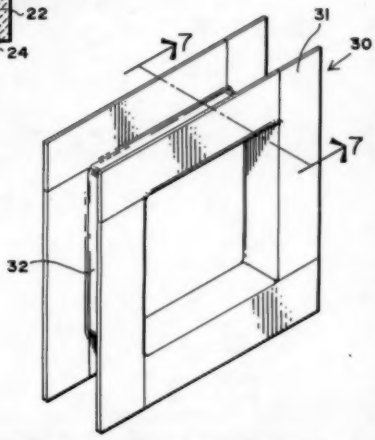
Division of Ser. No. 795,837, Nov. 7, 1985. This application Jan. 27, 1987, Ser. No. 6,793

Int. Cl.[4] B22D *19/00*

U.S. Cl. 164—98 3 Claims







1. The method of forming a composite break ring comprising the steps of,

forming a ring shaped mold having a frame body portion with a U-shaped cross-section the interior portion of

which is the bottom of the U and a base defining the interior dimension of the intended break ring,

temperature heating of a material to form the skin of the break ring and spraying the same interiorly of the mold,

temperature heating of the substrate skin beneath the first skin and applying the same in intimate contact to the first skin to thereby form an interior shell of the break ring,

and filling the balance of the body of the break ring with a third material.

4,715,424

BREAKER PAD

Alan P. B. Brown, 25 Karen Avenue, Lambton Gardens, Germiston, Transvaal, and Ian B. Reeves, Germiston, both of South Africa, assignors to Alan Paul Blakley Brown, Germiston, South Africa

Filed Jun. 16, 1986, Ser. No. 874,991

Claims priority, application South Africa, Jun. 20, 1985, 85/4642

Int. Cl.[4] B22D *31/00*

U.S. Cl. 164—264 **13 Claims**

1. A breaker pad which is formed with an orifice through which, in use, material flows, the wall of the orifice, viewed in a first direction which is substantially in-line with the direction of material flow through the orifice, including a plurality of angular formations which extend generally towards a central region of the orifice, each respective pair of adjacent angular formations having between them an angular recess which extends generally away from the said central region of the orifice.

4,715,425

CASTING MOULD

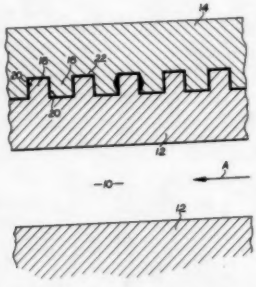
Richard W. Brosch, Sutton Coldfield, United Kingdom, assignor to Lymore Limited, United Kingdom

Continuation of Ser. No. 319,255, Nov. 9, 1981. This application Mar. 26, 1987, Ser. No. 30,883

Claims priority, application United Kingdom, Nov. 22, 1980, 8037513

Int. Cl.[4] B22D *11/00*

U.S. Cl. 164—418 **13 Claims**



1. A mould assembly for continuous casting comprising a lining formed as a layer of a lubricious non-wetting material defining a solidification chamber into which molten metal is flowed in use, and a cooling jacket having a cooling system through which liquid coolant is passed in use including a layer of metal interposed between said lining layer and the coolant, wherein the improvement comprises said layers being cemented together by a bonding agent at the interface between them; said layers having interfitting protruberances in the form of complementary close fitting rib and groove formations at said interface, at least some of said protuberances including re-entrant portions whose shaping allows the layers to be assembled together facewise-on and provides a mechanical key resisting subsequent separation of the layers due to the groove formations being filled with the bonding agent on assembly.

4,715,426

MACHINE FOR THE CURVED CONTINUOUS CASTING WITH RIGID STARTING BAR

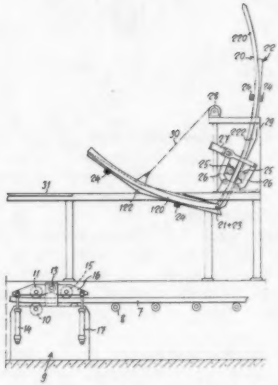
Luciano Klaucic, Gorizia, Italy, assignor to Continua International Continuous Casting S.p.A., Italy

Filed Nov. 7, 1986, Ser. No. 928,808

Claims priority, application Italy, Nov. 27, 1985, 12611 A/85

Int. Cl.[4] B22D *11/08*

U.S. Cl. 164—426 **9 Claims**



1. A machine for the curved continuous casting of metals, particularly steel, including a mold for producing a cast strand, a curved casting path leading from said mold to a substantially horizontal cast strand path, a reversible extractor-straightener means for straightening and advancing said cast strand and a starting bar having a head and a tail end, said starting bar having substantially the same curvature as the curved casting path and being positionable between a starting position wherein the head end closes the mold and the tail end is engaged by said extractor-straightener means and a stowed position disengaged from said mold and said extractor-straightener means above said substantially horizontal cast strand path, the improvement comprising:

a starting bar having a leading rigid segment, a trailing rigid segment, and means for pivotally connecting said segments together in succession; and

a folding starting bar support-guide means including a displaceable portion and means for pivotally connecting said displaceable portion to said support-guide means; said folding starting bar support-guide means being specially adapted so that the pivotal connecting means of said starting bar and said support-guide means may be brought into register when said starting bar is in the stowed position and the displaceable portion folded with the leading segment of said starting bar so as to move the head end of the starting bar away from the cast strand path to a readily accessible position.

4,715,427

PROCESS AND APPARATUS FOR AUTOMATING A BAKING CYCLE UNDER HOT AIR OF SAND MOLDS

Pierre L. Merrien, Billere, and Pierre A. Merrien, Sceaux, both of France, assignors to Etude et Development en Metallurgie, Billere, France

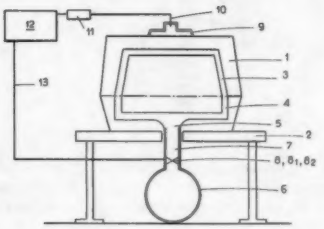
Continuation of Ser. No. 631,521, Jul. 18, 1984, Pat. No. 4,573,522, which is a continuation of Ser. No. 210,623, Nov. 26, 1980, abandoned. This application Oct. 10, 1985, Ser. No. 786,065

Claims priority, application France, Nov. 28, 1979, 79 29227

The portion of the term of this patent subsequent to Mar. 4, 2003, has been disclaimed.

Int. Cl.[4] B22C *9/12*

U.S. Cl. 164—456 27 Claims



1. A method of ensuring the proper removal of volatile organic materials from an object, said method comprising the steps of:

(a) determining an optimal concentration removal rate of volatile organic materials to be evaporated from an object as a function of time; and

(b) heating said object in such a manner that the concentration of volatile organic materials evaporating from said object as a function of time substantially conforms to said optimal concentration removal rate.

16. An apparatus for ensuring the proper removal of volatile organic materials from an object, said apparatus comprising:

(a) means for determining an optimal concentration removal rate of volatile organic materials evaporating from an object as a function of time; and

(b) means for heating said object in such a manner that the concentration of volatile organic materials evaporating from said object as a function of time substantially conforms to said optimal concentration removal rate.

4,715,428

METHOD AND APPARATUS FOR DIRECT CASTING OF CRYSTALLINE STRIP BY RADIANT COOLING

Robert H. Johns, and John D. Nauman, both of Natrona Heights, Pa., assignors to Allegheny Ludlum Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 650,371, Sep. 13, 1984, abandoned. This application Jun. 18, 1986, Ser. No. 876,309

Int. Cl.[4] B22D *11/06*

U.S. Cl. 164—463 3 Claims

1. Method of directly casting molten metal to continuous strip of crystalline metal, comprising:

flowing molten metal from a generally U-shaped structure of an exit end of a casting vessel onto an adjacent casting surface, the structure having edges substantially parallel to the casting surface and having a planar bottom wall and diverging inside sidewalls opening upwardly;

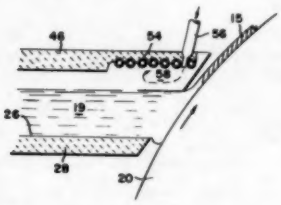
moving the casting surface generally upwardly past the exit end of the casting vessel at a predetermined distance therefrom to solidify the molten metal into strip form; and

additionally facilitating radiant cooling of the molten metal by a cooling means spaced from and in a zone defined above the molten metal top surface to extract heat therefrom, across the width of the U-shaped structure and adjacent the casting surface to affect the as-cast strip surface quality and structure.

2. An apparatus for directly casting molten metal to continuous strip of crystalline metal, comprising:

movable casting surface upon which molten metal solidifies into strip form;

casting vessel having an exit end including a U-shaped structure for flowing molten metal onto the moving casting surface adjacent thereto at a predetermined distance, the



structure having edges substantially parallel to the casting surface and having a planar bottom wall and diverging inside sidewalls opening upwardly; and

means for facilitating radiant cooling of the molten metal, said cooling means being spaced from and in a zone defined above the molten metal top surface to extract heat therefrom, across the width of the U-shaped opening and adjacent the casting surface to affect the as-cast strip surface quality and structure.

4,715,429

METHOD AND MEANS FOR APPLYING A HEAT EXCHANGER IN A DRILL HOLE FOR THE PURPOSE OF HEAT RECOVERY OR STORAGE

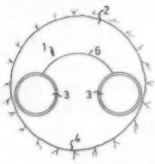
Palne Mogensen, Emblavägen 29, S-182 63 Djursholm, Sweden

Filed Jun. 16, 1986, Ser. No. 874,962

Claims priority, application Sweden, Jul. 2, 1985, 8503288

Int. Cl.[4] F25D *23/12*

U.S. Cl. 165—45 7 Claims

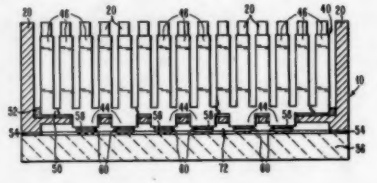


1. A method for applying a heat exchanger in a drill hole in rock, loose soils or the like for the purpose of heat recovery or storage, achieving a more efficient heat transfer between the defining surface of the drill hole and a heat transporting medium contained in the heat exchanger, the steps comprising: lowering substantially parallel heat-exchanging pipes into position in a drill hole and with said heat-exchanging pipes in said position, expanding said heat-exchanging pipes in a radial direction into at least partial contact with the defining surface of said drill hole by increasing the distance between said pipes.

4,715,430
ENVIRONMENTALLY SECURE AND THERMALLY EFFICIENT HEAT SINK ASSEMBLY

Allen J. Arnold, La Grangeville; Mark G. Courtney, Poughkeepsie; Diane N. Kirby, Poughkeepsie; Katherine H. Mis, Poughkeepsie, and Kerry L. Sutton, Wappingers Falls, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 27, 1986, Ser. No. 923,456
Int. Cl.[4] H01L *23/40*
U.S. Cl. 165—80.3 **16 Claims**



1. A thermally efficient and environmentally secure heat sink for cooling a semiconductor module comprising, in combination:

a frame member having a base portion thereof, said base portion having a rim, formed around the perimeter of said base portion and extending from one side thereof, for contacting a surface of a module to be cooled thereby, said frame member having first heat radiating means for removing heat therefrom disposed around the perimeter of said base portion and disposed on the side opposite said rim and projecting in a direction opposite said rim, said frame member including a support surface disposed inward of said heat radiating means;

a high thermal conductivity member including a base region with a flange which, in use, rests on said support surface, said base region having a plurality of projections each of which extends beyond said support surface toward the surface of the module to be cooled but does not extend beyond the plane in which said rim lies, said high thermal conductivity member including second means to radiate heat extending in a direction opposite said projections a distance, in use, which is less than the extent of projection of said first heat radiating means;

said frame member being constructed of a material having a thermal coefficient of expansion substantially the same as the thermal coefficient of expansion of the module to which the heat sink is to be attached; and

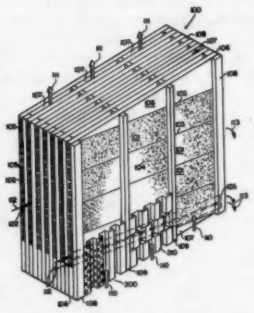
environmentally secure means to bond said high thermal conductivity member to said support surface of said frame member so that the bond therebetween is not permeable and remains not permeable after repeated thermal cycling of the heat sink.

4,715,431
REBOILER-CONDENSER WITH BOILING AND CONDENSING SURFACES ENHANCED BY EXTRUSION

Alexander Schwarz, Allentown, Pa.; Charles E. Kalb, East Northport, N.Y., and Charles C. Goebel, Westfield, Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Jun. 9, 1986, Ser. No. 872,310
Int. Cl.[4] F28F *3/04, 3/12;* F28D *9/02*
U.S. Cl. 105—110 **10 Claims**

1. A heat exchanger for reboiler-condenser service which comprises: a plurality of extruded passageways of a thermally conductive material comprising one or more internal longitudinal channels, means for condensate film thinning on all surfaces of said internal longitudinal channels, and means for promoting boiling on only two opposing exterior surfaces of the extruded passageway assembled in individual stacks, with said exterior without the means for promoting boiling of each of passageways juxtaposed to that of its neighbor, a plurality of stacks assembled in side-by-side relationship with said enhanced exterior boiling surface of said stack facing the means for promoting boiling of its neighboring stack, the individual stack of passageways is so assembled so that the longitudinal axes of said passageways are inclined from the horizontal without being vertical, thereby defining downward sloping condensing

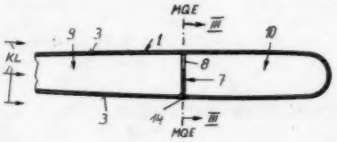


channels, with interposing support bars interposed between the exterior means for promoting boiling of neighboring stack of passageways; said support bars facing each other being vertical thereby defining vertical boiling channels; means for joining said support bars and passageways; and means for closing vertical edges between alternating pairs of passageways wherein the means for promoting boiling face each other.

4,715,432
AIR-COOLED TUBE CONDENSER

Paul Paikert, Witten, Fed. Rep. of Germany, assignor to GEA Luftkuehlergesellschaft Happel GmbH & Co., Bochum, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 738,024, May 24, 1985, abandoned. This application Aug. 5, 1986, Ser. No. 893,564
Claims priority, application Fed. Rep. of Germany, May 26, 1984, 3419734
Int. Cl.[4] F28B *1/00*
U.S. Cl. 165—110 **4 Claims**



1. An air-cooled surface condenser comprising a plurality of heat exchanger tubes provided with transverse fins and being elongated in the direction of cooling air flow and being all arranged in a single row extending transversely of the direction of air flow and each having a length many times greater than the width of the tube and being rounded at ends thereof, each finned heat exchanger tube having a changing cross-sectional area from one end to another end in said direction and including two continually changing portions which are symmetrical relative to a central plane of elongation of the tube, each tube having a front end portion and a rear end portion, as viewed in said direction, each tube having a cross-section which continually increases in the direction of elongation of the tube from said front end portion to said rear end portion and having opposite side walls each of which is slightly curved outwardly over the length of the tube from said front end portion to said rear end portion, each tube having an internal separating wall extended in a middle transverse plane of the tube and projecting over the entire depth of the tube, said

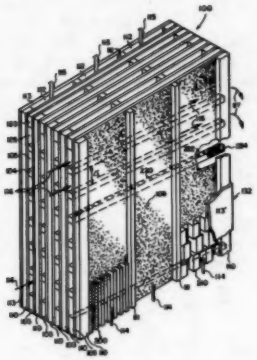
separating wall being formed with a plurality of spaced perforations provided in the region of one of said opposite side walls over the entire length of said separating wall whereby each tube is rigid and permitting a condensate collected in the tube to be drained in two separate streams while an excessive vapor in one of halves of the tubes separated by said separating wall can penetrate into another half of the tube through said perforations.

4,715,433

REBOILER-CONDENSER WITH DOUBLY-ENHANCED PLATES

Alexander Schwarz, Allentown, Pa., and Charles E. Kalb, East Northport, N.Y., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Jun. 9, 1986, Ser. No. 872,299
Int. Cl.[4] F28F *3/04, 3/12;* F28D *9/02*
U.S. Cl. 165—110 12 Claims



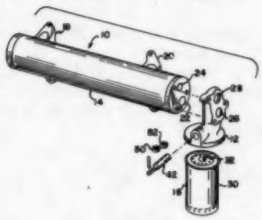
1. A heat exchanger for reboiler-condenser service which comprises: a plurality of plates of a thermally conductive material; with said plates having substantially horizontal and vertical edges and, on opposite sides of each plate, means for condensate film thinning and means for promoting boiling, respectively; said sheets assembled in a stack, with the means for condensate film thinning of each pair of plates facing each other and the means for promoting boiling of each pair of plates facing each other, with a plurality of interposing support bars, thereby defining between successive plates respective flow passages; said support bars between each pair of plates with the means for condensate film thinning facing each other extending between the vertical edges of each said pair of plates and being inclined from horizontal thereby defining downward sloping condensing channels and providing a primary means for drainage of condensate, and said support bars between each pair of plates with the means for promoting boiling facing each other being vertical thereby defining vertical boiling channels; means for joining said support bars and plates; first means for closing the horizontal edges between alternating pairs of plates with the means for condensate film thinning facing each other; and second means for closing vertical edges between alternating pairs of plates with the means for promoting boiling facing each other.

4,715,434

FLUID TREATMENT PRESSURE VESSEL WITH A DISPOSABLE CARTRIDGE AND VALVE THEREFOR

Gabriel J. Rudavicius, Lemont, Ill., assignor to Navistar International Transportation Corp., Chicago, Ill.

Filed Dec. 19, 1985, Ser. No. 810,943
Int. Cl.[4] F28F *13/12*
U.S. Cl. 165—119 1 Claim



1. For an internal combustion engine, a cooling fluid treatment and lubricating oil heat exchanger pressure vessel arrangement with a removable fluid treatment cartridge comprising:

a header having primary cooling fluid high and low pressure communicative passages, a cartridge inlet fluidly connected with said high pressure passage, a cartridge outlet fluidly connected with said low pressure passage, and a linear passage intersecting said cartridge inlet and outlet;

a lubricating-oil-to-coolant exchanger connected with said header having a high pressure coolant inlet connected with said primary high pressure passage of said header and a coolant outlet fluidly connected with said low pressure passage of said header, and said heat exchanger having a lubricating oil inlet and a lubricating oil outlet;

a rotatable valve spool inserted within said linear bore of said header having a pair of axially separated traversing apertures positionally aligned with said cooling fluid inlet and outlet;

deformable sleeves axially aligned with and inserted within said cooling fluid treatment inlet and outlet, said deformable sleeves being separated by said valve spool; and

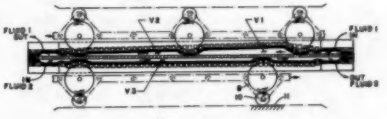
a cooling fluid treatment container sealably connected with said header surrounding said cartridge.

4,715,435

DUAL PUMP FOR TWO SEPARATE FLUIDS WITH MEANS FOR HEAT EXCHANGE BETWEEN THE FLUIDS

Claude H. Foret, 7122 Jordan Ave., Apt. 7, Canoga Park 91303

Filed Mar. 6, 1986, Ser. No. 836,759
Int. Cl.[4] F04B *43/12;* F28F *7/00*
U.S. Cl. 165—120 15 Claims



12. A heat exchanging pump for two separate fluids, comprising a platen extending along a linear path, a bulged diaphragm secured at its edges to the edges of said platen to provide therewith a conduit, means to progressively compress a portion of said diaphragm against said platen along said path to constitute a peristaltic pump, and a second conduit including the opposite side of said platen, said platen being of a heat transmitting character, there being an inlet and an outlet for said first mentioned conduit connectable to a source and destination respectively, of the first of said fluids, and an inlet and outlet for said second conduit, connectable to a source and

destination, respectively, of the second of said fluids, separate from said first fluid.

4,715,436

CONSTRUCTION OF A HEAT TRANSFER WALL OF A HEAT TRANSFER PIPE

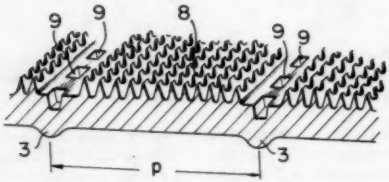
Kenji Takahashi, Abiko; Heikichi Kuwahara, Ibaraki; Takehiko Yanagida, Tsuchiura; Wataru Nakayama, Kashiwa; Kiyoshi Oizumi, Tsuchiura, and Shigeo Sugimoto, Ibaraki, all of Japan, assignors to Hitachi, Ltd. and Hitachi Cable, Ltd., both of Tokyo, Japan

Filed Sep. 18, 1985, Ser. No. 777,362

Claims priority, application Japan, Oct. 5, 1984, 59-208290

Int. Cl.[4] F28F *13/18, 19/02*

U.S. Cl. 165—133 **1 Claim**



1. A heat transfer tube comprising:

at least one row of projections provided on an inner surface of said heat transfer tube at regular intervals along a spiral curve thereof, said projections having smooth curved surfaces formed by plastic deformation of a part of said heat transfer tube which is effected by pressing a rolling disc provided with tooth means against an outer surface of said heat transfer tube, said projections having a height ranging from 0.45 mm to 0.6 mm, a pitch along the spiral curve ranging from 3.5 mm to 5 mm, and a pitch in an axial direction ranging from 5 mm to 9 mm;

a plurality of parallel minute grooves formed at a minute pitch on the outer surface thereof;

a plurality of minute fins provided between said grooves; and

notches formed on said minute fins and having a depth smaller than said grooves; and

wherein a forward end of each of said fins is sharply pointed.

4,715,437

HEAT EXCHANGER

Hiroyoshi Tanaka, Kyoto; Masaaki Adachi, Nara; Yoshiyuki Tsuda, Suita; Toshiaki Ando, Yawata; Humitoshi Nishiwaki, Nishinomiya, and Shigeo Aoyama, Higashiosaka, all of Japan, assignors to Matsushita Electric Industrial Co. Ltd., Osaka, Japan

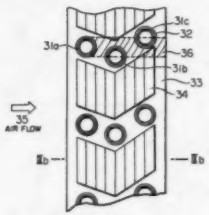
Filed Apr. 14, 1986, Ser. No. 851,507

Claims priority, application Japan, Apr. 19, 1985, 60-83833; May 24, 1985, 60-112445

Int. Cl.[4] F28D *1/04*

U.S. Cl. 165—151 **2 Claims**

1. A heat exchanger, comprising: (a) a plurality of plate-shaped fins positioned in spaced parallel relationship with one another; and (b) a plurality of substantially parallel heat-transfer tubes intersecting said plurality of fins, said heat-transfer tubes being disposed in a plurality of non-linear rows oriented along a predetermined direction in a longitudinal dimension of said fins, said predetermined direction being adapted to correspond to a primary air flow direction of air passing between said fins, said fins including a plurality of cutouts opening toward said predetermined direction, said cutouts being provided between adjacent ones of said rows of heat-transfer tubes, a downstream-side projection area of each of said heat-transfer tubes located on an upstream side of said predetermined direction relative to said primary air flow direction partially overlaps the position of at least one of said heat-transfer tubes disposed on the downstream side of said predetermined direction, each of said cutouts being substantially channel-shaped and comprising two sides of cutting lines facing the air flow and two legs connecting each cutout with its associated fin, said two legs being inclined relative to said predetermined direction, a plurality of said channel-shaped cutouts being successively, discretely disposed and oriented in a slant-wise direction relative to said predetermined direction in a repetitive pattern such that the legs of said respective cutouts are aligned along respective directions which extend generally parallel to a line connecting at least two adjacent heat transfer tubes in one of said rows of heat transfer tubes.



4,715,438

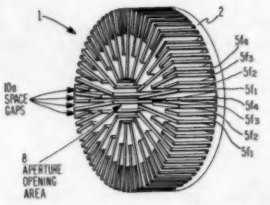
STAGGERED RADIAL-FIN HEAT SINK DEVICE FOR INTEGRATED CIRCUIT PACKAGE

Paul G. Gabuzda, Laguna Beach, and Sanford V. Terrell, Laguna Hills, both of Calif., assignors to Unisys Corporation, Detroit, Mich.

Filed Jun. 30, 1986, Ser. No. 880,427

Int. Cl.[4] F28F *7/00*

U.S. Cl. 165—185 **6 Claims**



1. A heat sink device for attachment to an integrated circuit package and placed perpendicular to an impinging air flow, said device comprising:

(a) a circular metallic base plate attachable to an integrated circuit package unit, and supporting a plurality of metallic fin elements wherein the said base plate includes:

(a1) a hemispheric dome at the center of said base plate for the purpose of receiving and dispersing said impinging air flow directed perpendicular to said base plate;

(b) said plurality of metallic fin elements equally spaced with air space interstices around the periphery of said base plate wherein said fin elements constitute a pattern of long, intermediate and short lengths oriented in the radial direction to form a repetitive sector pattern wherein said repetitive sector pattern includes:

(b1) a sequence of said radial fin element lengths which follow the pattern of long-short-intermediate-short, which pattern repeats through each sector of the circumference of said heat sink device; and wherein

(b2) the width of each of said plurality of fin elements is of the same dimension, and

(b3) the width of each of the said air space interstices

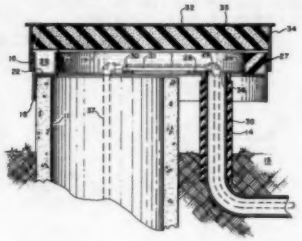
between adjacent fin elements is substantially the same as the width of each of said fin elements;

(c) a central cylindrical open space situated at the central area of said base plate to permit the perpendicular impingement of said air flow onto said base plate.

4,715,439
WELL CAP

Roy E. Fleming, Rte. 1, Box 741, McKenney, Va. 23872

Filed Mar. 3, 1987, Ser. No. 21,215
Int. Cl.[4] E21B *33/04*
U.S. Cl. 166—68 **5 Claims**



1. A well cap adapted to be positioned atop the circular cylindrical casing of a well which accumulates potable subterranean water, said well cap comprising:

(A) a lower member having (1) a continuous outer sidewall of uniform height between upper and lower extremities and configured to be vertically disposed in a perimeter comprised of a large circular arc and an outlying region extending radially and horizontally away from the large circular arc and terminating in an extremity shaped as an arc of a circle of smaller radius than the radius of said large arc, (2) a horizontally disposed shelf attached to said outer sidewall and extending a uniform distance inwardly with respect to said perimeter, (3) a floor panel disposed horizontally within said outlying region in substantially coplanar alignment with said shelf and having a circular aperture adjacent the circular arc extremity of said outlying region, (4) a first support beam extending diametrically through the center of said large circular arc and joined to opposed sides of said shelf, (5) a second support beam joined to the center of said first support beam and extending to the circular aperture of said outlying region while resting upon said floor panel, and (6) thermal insulation disposed upon said shelf about said perimeter to a height even with the upper extremity of said sidewall,

(B) an upper member comprised of (1) a flat panel having a perimeter which matches the perimeter of the outer sidewall of said lower member, (2) a continuous boundary wall of uniform height perpendicularly disposed to said flat panel about its entire perimeter, and (3) self-supporting thermal insulation which covers said flat panel to a uniform height, and

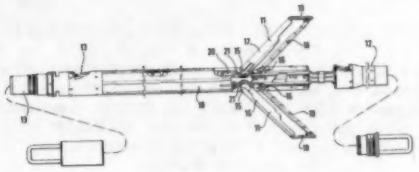
(C) a circular cylindrical tube having an upper extremity which joins the circular aperture of said outlying region and a continuous annular zone of self-supporting thermal insulation, said tube being oriented to extend vertically into the ground adjacent said well casing, whereby

(D) when the upper member is seated upon the lower member, and the lower member is seated upon said well casing, a pump suspended within said well by said first support beam can pump water through a conduit which extends upwardly above said first support beam, runs horizontally toward the circular aperture in said outlying region, thence downwardly through said tube to a depth below the prevailing frost line and thence to a distributor line which extends to the point of ultimate water use, the water in said conduit being protected from freezing during its transfer from the well to said distributor line.

4,715,440
DOWNHOLE TOOLS

Timothy G. Boxell, Haslemere; Frank B. Bardsley, Andover, and David E. Stoddart, Stroud, all of England, assignors to Gearhart Tesel Limited, Basingstoke, England

Filed Jul. 14, 1986, Ser. No. 885,241
Claims priority, application United Kingdom, Jul. 25, 1985, 8518823
Int. Cl.[4] E21B *47/00*
U.S. Cl. 166—100 **36 Claims**

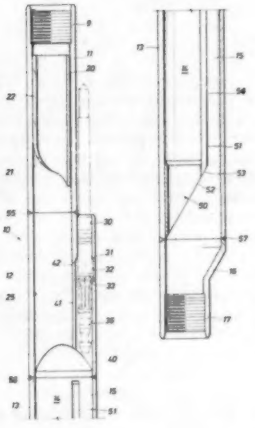


1. A tool for use downhole comprising an elongate body, a plurality of arm means movably mounted on the body, and means for controlling movement of the arm means between an operational position in which the arm means extend outwardly with respect to the body and a retracted position, the arm means movement controlling means comprising a motor, presser means movable rectilinearly in response to operation of the motor and independent resilient means located between said presser means and each of said arm means for permitting independent movement of said arm means in response to force exerted on said arm means by surrounding material.

4,715,441
SIDE POCKET MANDREL

Douglass W. Crawford; William B. Crawford, both of P.O. Box 51, Atwood Akers, Crowley, La. 70526, and Mark S. Crawford, 501 Kaiser Dr., Lafayette, La. 70508

Filed Oct. 18, 1985, Ser. No. 789,313
Int. Cl.[4] E21B *23/03*
U.S. Cl. 166—117.5 **20 Claims**



1. A side pocket mandrel comprising: a tubular body section having a hollow interior that defines a main bore to one side thereof and another bore to the other side thereof; a short-length seating section welded to one end of said body section,

said seating section having a main bore formed to one side thereof aligned with said main bore in said body section, and a valve seating bore formed on the other side thereof generally aligned with said other bore, said seating bore having a polish section adjacent its outer end, said outer end opening through an exterior end surface of said mandrel, said seating bore having a recessed section adjacent said polish section, said recessed section providing an inwardly facing stop shoulder at one end thereof and a latch shoulder at the other end thereof facing said stop shoulder; and a tubular member welded to said seating section in axial alignment with said main bores, the axis of said polish section of said seating bore being inclined toward the axes of said main bores at a small angle.

4,715,442

APPARATUS FOR SERVICING TUBULAR STRINGS IN SUBTERRANEAN WELLS

John E. Kahil; Mark S. Jaynes, and Kirby R. Harrell, all of Houston, Tex., assignors to PA Incorporated, Houston, Tex.

Continuation of Ser. No. 599,163, Apr. 11, 1984, abandoned.
This application Feb. 10, 1986, Ser. No. 808,936
The portion of the term of this patent subsequent to Dec. 16, 2003, has been disclaimed.
Int. Cl.[4] G01N *27/82*; G01R *33/12*
U.S. Cl. 166—250 **13 Claims**

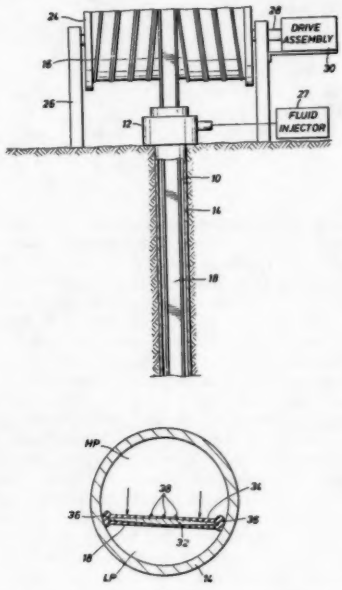
1. Apparatus for use in servicing a tubular string formed from a series of interconnected tubular sections used in subterranean oil or gas wells, the apparatus including a substantially horizontal floor and a structure positionable over the well head for sequentially hoisting and lowering individual tubular sections of the tubular string through the floor relative to the well head; the improvement comprising: an annular defect detecting housing fixedly positioned on the well head below the floor in surrounding relation to the path of the sequentially removed tubular sections; a plurality of insulating segments rotationally fixed with respect to the housing and mounted in said annular housing for radial movement between an inner detecting position and an outer position for clearing obstructions carried by the tubular sections; means for limiting radially inward movement of the insulating segments to the inner detecting position spaced outwardly from engagement with the tubular sections; means for detecting an approaching obstruction on any tubular section for concurrently shifting said insulating segments to said outer position; a plurality of detecting means mounted on said insulating segments in surrounding relation to the path travelled by the sequentially removed tubular sections; and said detecting means comprising means for determining the existence of a plurality of different defects in each tubular section as each tubular section is passed through the annular defect detecting housing.

4,715,443

BAFFLE SYSTEM FOR CONDUCTING WELL TREATING OPERATIONS

John L. Gidley, Houston, Tex., assignor to Exxon Production Research Company, Houston, Tex.

Filed Dec. 4, 1986, Ser. No. 937,779
Int. Cl.[4] E21B *19/22, 33/10, 47/00*
U.S. Cl. 166—250 **36 Claims**



1. A baffle system for segmenting a tubular member into a first conduit and a second conduit, said baffle system capable of withstanding a pressure differential between said first conduit and said second conduit, comprising:

a core positionably insertable into said tubular member substantially coaxial with said tubular member to segment said tubular member into a first conduit and a second conduit;

a sleeve surrounding said core; and

sealing means extending from said sleeve to be engageable with the inner surface of said tubular member for forming a seal between said first conduit and said second conduit.

24. A method for segmenting tubing in a well bore, comprising the steps of:

positionably inserting a baffle into said tubing so said baffle is substantially coaxial with said tubing to segment said tubing into a first conduit and a second conduit, said baffle comprising a core, a sleeve surrounding said core, and sealing means extending from said sleeve to be engageable with the inner surface of said tubing; and

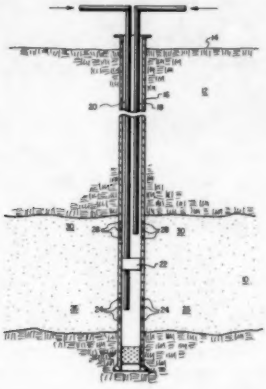
injecting a fluid into said first conduit at a sufficient pressure so that said sealing means of said baffle contacts the inner surface of said tubing to form a fluid seal between said first conduit and said second conduit.

4,715,444

METHOD FOR RECOVERY OF HYDROCARBONS

Donald J. MacAllister, Carrollton, and Virginia W. Pennington, Dallas, both of Tex., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Oct. 27, 1986, Ser. No. 923,241
Int. Cl.[4] E21B *43/16, 43/20*
U.S. Cl. 166—269 3 Claims



1. A method for recovering hydrocarbons from a subterranean hydrocarbon-containing formation penetrated by at least two wellbores, said method comprising:

(a) Injecting a gaseous stream into said formation near the bottom of said formation through a first wellbore said gas being gaseous at the temperature and pressure in said formation and selected from the group consisting of carbon dioxide, nitrogen, light hydrocarbon gases and mixtures thereof;

(b) Injecting a liquid aqueous stream into said formation near the top of said formation through said first wellbore; and

(c) Recovering hydrocarbons from said formation through a second wellbore wherein said gaseous stream and said aqueous stream are injected substantially simultaneously and substantially continuously.

4,715,445

LATCH AND RETRIEVING ASSEMBLY

Sidney K. Smith, Jr., Huntsville, Tex., assignor to Hughes Tool Company, Houston, Tex.

Filed Dec. 9, 1986, Ser. No. 939,652
Int. Cl.[4] E21B *23/00, 31/20*
U.S. Cl. 166—377 7 Claims

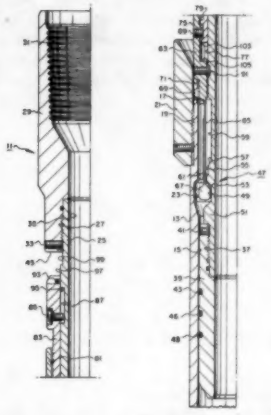
1. A latch and retrieving assembly for use with a well tool having an axial bore, the wall of the bore having an internal landing shoulder and an annular latch recess spaced below the landing shoulder, the assembly comprising:

a mandrel insertable in the bore of the well tool, the mandrel having upper connecting means for connection in a well pipe string extending to the well surface;

a lower abutment on the mandrel;

a collet member slidably mounted about the mandrel, the collet member including a carrier ring seatable on the shoulder and a plurality of elongate, resilient fingers depending from the carrier ring and terminating in radially enlarged tips disposed in registration with the recess when the carrier ring is seated on the landing shoulder, the tips cooperating with the lower abutment to latch into and to be released from the recess respectively in response to downward movement of the mandrel;

the lower abutment including a carrying groove adjacent a lowermost extent of the mandrel, an upwardly slanting wall region which joins the carrying groove to a plateau region, and a downwardly slanting wall region which joins the plateau region to a releasing groove, whereby downward movement of the mandrel moves the collet tips onto the plateau region and radially outward into latching engagement with the recess and whereby continued downward movement of the mandrel moves the releasing groove beneath the collet tips to allow inward radial movement of the collet tips for disengagement with the recess, the plateau region having a retaining shoulder for



engaging the collet tips which allows downward relative movement of the mandrel but thereafter restricts upward relative movement; and

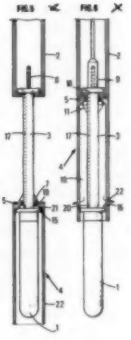
wherein the collet carrier ring includes a plurality of radially extending torque lugs which are received within mating slots in the bore of the well tool whereby torque transmitted from the well surface through the pipe string is transmitted from the collet to the well tool.

4,715,446

DEVICE AND METHOD FOR THE TEMPORARY PROTECTION OF A WORKING TOOL OR MEASURING INSTRUMENT FIXED TO THE END OF A DRILL STRING

Christian Wittrisch, Rueil Malmaison, France, assignor to Institut Francais du Petrole, Rueil-Malmaison, France

Filed Jun. 19, 1986, Ser. No. 875,975
Claims priority, application France, Jun. 19, 1985, 85 09434
Int. Cl.[4] E21B *23/00*
U.S. Cl. 166—381 16 Claims



1. A retractable protective device for a specialized tool for working in a well with said tool being fixed to the end of a drill

string, said device comprising a casing for protecting said tool, said drill string having substantially at its end and before said tool a first guide member and said casing having a second guide member, said first and second guide members being adapted for cooperating with each other so as to allow relative movement of said casing with respect to said tool and to said drill string.

7. A method for protecting a specialized tool for operating in a well with a casing and for using the tool within the well, said tool being fixed to the end of a drill string and said casing being mounted for sliding relative to an assembly formed by said tool and said drill string, which comprises positioning said tool in the well within the casing and effecting relative movement of the casing with respect to said tool and to said drill string to position the tool outside of said casing.

4,715,447

QUICK RESPONSE AUTOMATIC FIRE SPRINKLER HEAD

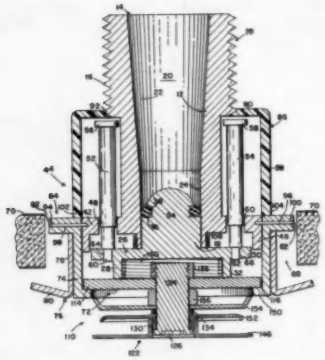
Kimball W. Johnson, 36 Rocky Hill Rd., Oxford, Mass. 05140

Continuation-in-part of Ser. No. 732,677, May 10, 1985, Pat. No. 4,596,289. This application May 29, 1986, Ser. No. 867,945

The portion of the term of this patent subsequent to Jun. 24, 2003, has been disclaimed.

Int. Cl.[4] A62C *37/08*

U.S. Cl. 169—37 **31 Claims**



19. Means for maintaining a valve assembly comprising a valve body member and deflector plate supporting said valve body member of a fire sprinkler head comprising a housing having an open bottom end, in the closed position until the attainment of a predetermined temperature with the onset of a fire comprising, in combination, a planar horizontally disposed member divided into two sections of equal size and of the same shape along a dividing line therefor, each of the said two sections having an upper planar surface and said surfaces being coplanar with one another and said two sections abutting one another at said dividing line, and means responsive to heat for maintaining said two sections together and in a horizontally disposed plane until the attainment of said predetermined temperature, said heat responsive means comprising means bridging said dividing line and being in direct engagement with each of said sections on opposite sides of said dividing line and a suitable eutectic composition.

4,715,448

FIRE EXTINGUISHER OUTLET HEAD

Alister L. McCulloch, 18 Berwick Brae Drive, Berwick, Victoria, Australia (3806)

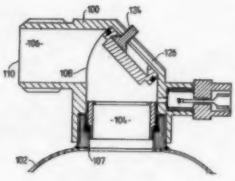
PCT No. PCT/AU85/00153, § 371 Date Mar. 6, 1986, § 102(e) Date Mar. 6, 1986, PCT Pub. No. WO86/00969, PCT Pub. Date Feb. 13, 1986

PCT Filed Jul. 15, 1985, Ser. No. 845,696

Claims priority, application Australia, Jul. 24, 1984, PG6189/85

Int. Cl.[4] A62C *35/12*

U.S. Cl. 169—62 **5 Claims**



1. An explosively actuated fire extinguisher outlet head comprising a housing having a passage adapted to communicate with extinguishant under pressure, said passage comprising a first passage portion having an inlet and outlet, a second passage portion being downstream of the first and extending transverse thereto, and means defining a junction between said first and second passage portions, a charge plug sealing the first passage portion, said plug having a head adapted to be sheared off upon actuating of an explosive charge whereby to permit discharge of the extinguishant through the passage, the interior of the passage being shaped to guide the sheared head for movement under the pressure of the released extinguishant along a curved path away from the junction between the first and second passage portions to be retained in a position in which flow of extinguishant from said first to said second passage portion is substantially unimpaired by the sheared head, wherein the passage comprises a wall inclined to the axes of the first and second passage portions so as to face the outlet from the first passage portion and the inlet to the second passage portion, said outlet head further comprising retaining means for retaining the plug head against said inclined wall after shearing, said retaining means comprising a pin projecting transversely from said wall into the passage and having a head part shaped to engage and retain the sheared plug head, said pin being mounted in a bore extending through said wall for axial movement upon engagement by the sheared plug head whereby displacement of an outer end of the pin externally of said wall upon engagement of the plug head with the pin provides indication of actuation of the fire extinguisher outlet head.

4,715,449

SELF-DUMPING CROP SHIELD

David C. Winter, Johnston, and William R. Wood, Ames, both of Iowa, assignors to Deere & Company, Moline, Ill.

Filed Jul. 11, 1986, Ser. No. 884,458

Int. Cl.[4] A01B *39/26*

U.S. Cl. 172—513 **14 Claims**

1. In a cultivating implement adapted for forward movement over the ground and having earthworking tools transversely spaced on a frame for cultivating soil containing trash between parallel rows of plants, shield structure for protecting the plants from soil throw, said structure comprising:

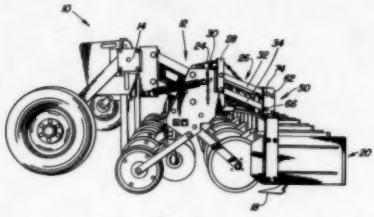
a fore-and-aft extending plant shield;

upright support structure connected to and extending upwardly from the shield;

linkage structure having a forward end connected to the implement frame and extending rearwardly from the

frame to a rear portion, said linkage structure comprising upper and lower fore-and-aft extending links;

means pivotally connecting the upper end of the support structure to the rear portion of the linkage structure for rocking about a transversely extending axis located a substantial distance above the plant shield to thereby permit the shield to rock vertically about the axis between a lower crop shielding position and a raised trash-dumping position; and



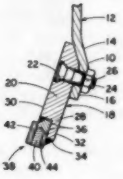
wherein the support structure includes means for limiting the downward rocking of the shield to the lower crop-shielding position and permitting upward rocking of the shield toward the trash-dumping position, said means for limiting the downward rocking including pin means connected to the aft end of one of the links and wherein said means pivotally connecting the upper end is connected to the aft end of the other of the links for maintaining the shield in a preselected atttiude when in the crop-shielding position.

4,715,450

GRADER BLADE WITH CASTING/INSERT ASSEMBLY ON LEADING EDGE

Robert P. Hallissy, Jeannette; Edmund Isakov; Earle W. Stephenson, both of Latrobe, and Don C. Rowlett, Bedford, all of Pa., assignors to Kennametal Inc., Latrobe, Pa.

Filed Feb. 20, 1987, Ser. No. 17,106
Int. Cl.[4] E02F 3/815
U.S. Cl. 172—701.3 **12 Claims**



1. A grader blade comprising:

(a) a steel body having a bottom edge with a recess formed along a forward portion of said edge; and

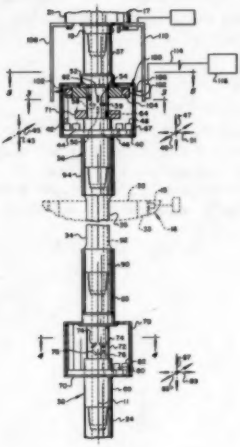
(b) a casted assembly composed of a rear prefromed cemented carbide insert and a front casted layer of carbide grit in combination with a substrate of casting material holding said insert and layer in a tiered contacting and attached relationship with one another, said casted assembly being disposed in said recess and said substrate welded to said body.

4,715,451

MEASURING DRILLSTEM LOADING AND BEHAVIOR

Amjad A. Bseisu, Dallas; Yih-Min Jan, and Frank J. Schuh, both of Plano, all of Tex., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Sep. 17, 1986, Ser. No. 908,132
Int. Cl.[4] E21B 47/00
U.S. Cl. 175—40 **15 Claims**



1. A system for measuring the behavior of an elongated drillstem while forming a drillhole, said drillstem being characterized by elongated tubular means having a drillbit disposed at the lower distal end thereof to form a drillhole below the earth's surface, and said drillistem being connected substantially at its upper or opposite end to means for rotating said drillstem, said system comprising:

at least a first sub connected to an upper region of said drillstem, said first sub including a generally tubular member; and

accelerometer means mounted on said first sub and adapted to produce electrical signals related to vibrations of said drillstem whereby the behavior of said drillstem at a point below said surface may be correlated with said vibration, said accelerometer means including at least two accelerometers disposed on said first sub in a common plane substantially opposite each other and on opposite sides of a longitudinal central axis of said first sub, said two accelerometers being capable of producing signals of variable amplitude indicating axial displacement of said drillstem in opposite directions and in such a way that in response to axial displacement of said first sub and bending displacement of said first sub, respectively, the signal amplitude of said two accelerometers may be compared to determine whether said drillstem is operating in an axial vibration mode or a bending vibration mode.

11. A method for determining the location of interaction between an elongated rotary drillstem and a downhole structure in a wellbore wherein said drillstem is characterized by an elongated tubular member having a drillbit or the like disposed at the lower distal end thereof to form a drillhole and said drillstem being connected substantially at its upper or opposite end to means for lifting or lowering said drillstem, said method comprising:

providing a sub disposed at an upper region of said drillstem, said sub comprising a generally tubular member;

providing first means on said sub for measuring at least an axially directed surface deflection wave on the outer surface of said sub, said surface deflection wave being related to an axial deflection of said drillstem;

providing second means on said sub for measuring a torsional deflection wave propogated along the surface of said drillstem and related to interaction between said drillstem and a downhole structure;

measuring axial and torsional strains on said drillstem related to signals produced by said first and second means, respectively; and

comparing the time difference between an axial peak strain sensed by said first means and a torsionally induced peak strain sensed by said second means for determining the location of said interaction between said drillstem and said downhole structure,

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4,715,452

METHOD OF DRILLING A DIRECTONAL WELL BORE

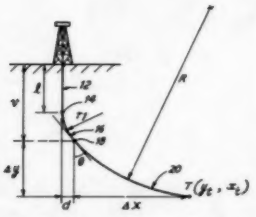
Michael Sheppard, Cambridge, England, assignor to Prad Research and Development NV, Curacao, Netherlands Antilles

Filed Jan. 7, 1986, Ser. No. 816,668

Claims priority, application United Kingdom, Jan. 8, 1985, 8500458

Int. Cl.[4] F21B 7/04

U.S. Cl. 175—61 3 Claims



1. An improved method of drilling a directional well borehole with a drill string, along a predetermined trajectory extending between a starting location at the surface and an underground final depth point horizontally and vertically displaced from said starting location, said method comprising the steps of:

(1) drilling a first, substantially vertical section of said borehole under said starting location;

(2) drilling a second section of said borehole having a substantially constant build rate, said second section immediately preceding said final depth point; and

(3) drilling a third section of said borehole having a substantially constant build rate, said third section being formed at the end of said first section between said first and second sections, and said third section having a build rate substantially greater than that of said second section, and a length substantially smaller than that of said second section.

4,715,453

DRILLING DEVIATION CONTROL TOOL

Thomas E. Falgout, Sr., Youngsville, and William N. Schoeffler, Lafayette, both of La., assignors to Team Construction and Fabrication, Inc., Youngsville, La.

Filed Oct. 30, 1986, Ser. No. 924,907

Int. Cl.[4] E21B 17/10

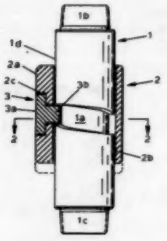
U.S. Cl. 175—73 17 Claims

1. A well drilling tool for use in a drill string assembly to aid in well bore control, the tool comprising:

(a) a body comprising a drill string length;

(b) at least one roller means situated on said body, arranged to engage a well bore wall and situated to rotate around said body;

(c) axial reciprocator means operatively associated with said body and said roller to urge said roller to reciprocate



axially relative to said body when said body rotates relative to said roller.

4,715,454

MECHANICAL DIRECTIONAL DRILLING JAR WITH SWIVEL MEANS

Chuan C. Teng, Lawrence Administrative Services Inc., P.O. Box 15250, Houston, Tex. 77220-5250; Rene A. Chapelle, Lawrence Administrative Services Inc., P.O. Box 2866, Conroe, Tex. 77305; John E. Blacklaws, Lawrence Administrative Services Inc., P.O. Box 15250, Houston, Tex. 77220-5250, and Lee E. McComsey, Dailey Petroleum Services Inc., 12860 Old Seward Hwy., Anchorage, Ak. 99511-0049

Filed Jun. 3, 1986, Ser. No. 870,087

Int. Cl.[4] E21B 31/107

U.S. Cl. 175—299 12 Claims

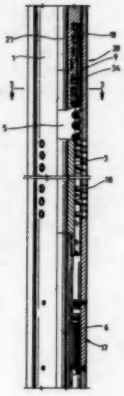
1. A drilling jar comprising:

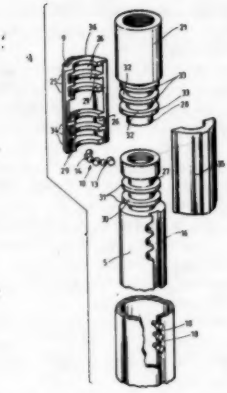
a barrel;

a polished stem, having upper and lower ends, said polished stem engaged to said barrel;

a jay stem having upper and lower ends, said lower end connected to said barrel and including means for enabling the tripping of said drilling jar, said upper end connected to said lower end of said polished stem; means for engaging said polished stem to said barrel; means for engaging said jay stem to said barrel; and

a swivel for connecting said lower end of said polished stem to said upper end of said jay stem, enabling said jay stem





to rotate substantially independently of the rotational movement of said polished stem.

4,715,455

DRILL SHOE

Martin A. Bollands; William C. Pike, both of Surrey; Prem S. Thukral, and Timothy P. Woolmington, both of Middlesex, all of England, assignors to The British Petroleum Company p.l.c., London, England

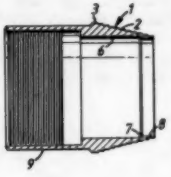
Filed Oct. 14, 1986, Ser. No. 918,320

Claims priority, application United Kingdom, Oct. 18, 1985, 8525757

Int. Cl.[4] E21B *10/02*

U.S. Cl. 175—402 **5 Claims**

1. A drill shoe adapted to fit onto a drill pipe of external diameter d_e and internal diameter d_i, the shoe comprising an externally stepped cutting surface comprising a plurality of steps, the diameters of the steps increasing as they progress away from the tip of the shoe, the maximum external D_e diameter of the shoe being greater than the external diameter d_e of the drill pipe, the shoe also comprising an internal, substantially cylindrical, inner surface of diameter D_i, D_i being less



than the internal diameter d_i of the drill pipe and the internal diameter of the shoe is further reduced at the tip.

4,715,456

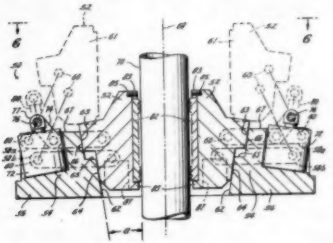
SLIPS FOR WELL PIPE

Frank E. Poe, Jr.; Dan R. Schwertner; Cooper L. Dunn, and Melvyn F. Whitby, all of Houston, Tex., assignors to Bowen Tools, Inc., Houston, Tex.

Filed Feb. 24, 1986, Ser. No. 832,315

Int. Cl.[4] E21B *19/10*

U.S. Cl. 175—423 **18 Claims**



1. A slip assembly adapted to engage pipe for movement of pipe into or out of a well bore comprising:

a slip having a pipe engaging surface and a slip block contact surface;

a slip block which engages the slip along a slip contact surface that is angled with respect to the pipe engaging surface;

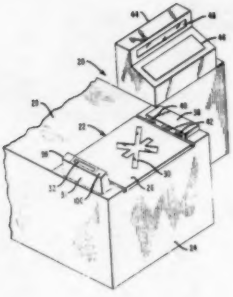
parallel vertically spaced links which pivotally connect the slip and slip block for movement of the slip into engagement with the slip block along said contact surfaces, each link having a first end pivotally connected to the slip and a second end pivotally connected to the slip block; and which, during both engagement and disengagement of the pipe engaging surface of the slip with the pipe, maintains said pipe engaging surface substantially parallel to the axis of the pipe; and

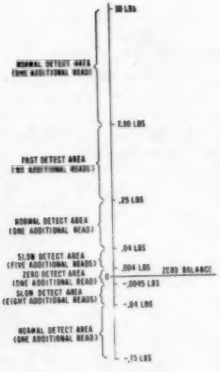
actuating means for pivoting the link to move the slip relative to the slip block, said actuating means being pivotally connected to said link between the second end of the link and the mid-point of the link between the pivotal connections on the first and second ends of the link.

4,715,457
METHOD FOR FAST WEIGHING

Gene L. Amacher, Cambridge; Gene R. Mathes, Zanesville; John F. Paugstat, Salesville, and Barry M. Mergenthaler, Cambridge, all of Ohio, assignors to NCR Corporation, Dayton, Ohio

Filed May 27, 1986, Ser. No. 867,650
Int. Cl.[4] G01G *19/52, 23/14, 23/10*
U.S. Cl. 177—1 16 Claims





1. A method for fast weighing using an electronic scale, comprising the following steps:

providing an electrical signal representative of the weight of an object placed upon the scale;

periodically sampling said electrical signal to obtain a plurality of instantaneous analog representations of the weight of said object;

digitizing said instantaneous analog representations to provide a plurality of digital values representative of the weight of said object;

storing said digital values;

comparing each current digital value with the immediately preceding value to determine whether said values are similar, as defined by differing by less than a predetermined amount;

comparing each compared current digital value which is similar to its previous value with a zero scale balance value to determine whether said compared current value is similar to said zero scale balance value as defined by differing by less than a predetermined count;

maintaining a count of the number of values sampled;

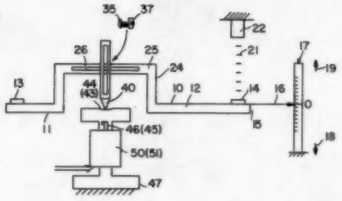
providing the most recent digital value which is not similar to a zero scale balance value as the desired weight when the weight is within a first range; and

providing the most recent digital value as the desired weight following a first number of similar samplings when the weight is within a second range.

4,715,458
BEAM BALANCE WITH UNEQUAL ARMS AND DIDDER DEVICE

Pedro C. De Angelis, and Nedo D. L. Dragicevic, both of Cochabamba, Bolivia, assignors to Darko Jorge Lazaneo Dragicevic, Cochabamba, Bolivia

Filed Jul. 11, 1986, Ser. No. 884,810
Int. Cl.[4] G01G *23/14, 3/14, 1/18*
U.S. Cl. 177—172 7 Claims



1. Apparatus for measuring and detecting minute mechanical forces, such as those crated by the energy of an energy beam, the apparatus comprising:

(a) a balance beam, the balance beam having a U-shaped portion designating a fulcrum area, the U-shaped portion having a bite with a horizontal slot therein, the balance beam having unequal arms and first and second ends wherein the first end has an area thereon for mounting weights to adjust the attitude of the second end, a force measurement area at the second end, one of the ends having a pointer thereon for registering with the scale in order to designate a zero point and to indicate movement of the end in positive and negative directions; and

(b) a pivot post having a vertical slot therein and a horizontally extending blade extending in a direction normal to the extent of the balance beam;

(c) fastening means in registration with the horizontal slot in the bite portion and the vertical slot in the pivot post for fixing releasably the pivot post with respect to the bite of the U-shaped portion;

(d) fulcrum means for supporting the balance beam, the fulcrum means having support areas engaged by the edge of the blade, and means for vibrating the fulcrum means so as to reduce friction between the blade and areas supporting the blade whereby the sensitivity of the balance is enhanced.

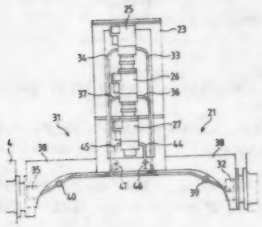
4,715,459
DRIVE FOR VEHICLES

Leo Stahl, Hub-Busswil, Switzerland, assignor to Leo Stahl AG, Busswil, Switzerland

Filed Jun. 23, 1986, Ser. No. 877,252
Claims priority, application Switzerland, Jun. 26, 1985, 2741/85
Int. Cl.[4] B62D *11/04*
U.S. Cl. 180—6.48 9 Claims

1. A drive for a vehicle with a travelling gear, in which the travelling gear is driven by a drive unit via a hydraulic gearing arrangement including at least one hydraulic gear with pump means for each side of the travelling gear, the mulitplication factor for one side of the travelling gear being adjustable for driving and steering independently of the other side of the travelling gear, the hydraulic pump means of the hydraulic gear comprising first and second hydraulic pump means coupled in series with one another said first hydraulic pump means being coupled by a first end of its shaft to the drive unit and by the second opposite end of its shaft to the first end of the shaft

of a following second hydraulic pump means, at least a third hydraulic pump means also coupled in series with the hydraulic pump means for said travelling gear, the second end of the shaft end of the following second, hydraulic pump means being



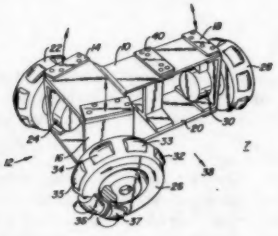
coupled to the first end of the shaft of the third hydraulic pump means, the last hydraulic pump means having the first end of its shaft engagable and disengagable from the second end of the shaft of the next-to-last hydraulic pump means by means of a clutch.

4,715,460

OMNIDIRECTIONAL VEHICLE BASE

Robert E. Smith, Cupertino, Calif., assignor to International Texas Industries, Inc., San Antonio, Tex.

Filed Nov. 20, 1984, Ser. No. 673,965
Int. Cl.⁴ B62D *61/00*
U.S. Cl. 180—7.1 **24 Claims**



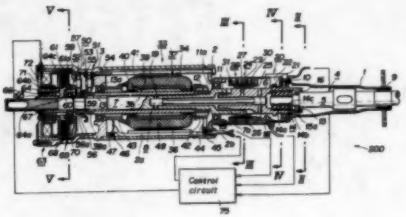
1. An vehicle base comprising:
an upper flexible base plate;
a lower flexible base plate;
a pair of front supports and a rear support disposed between and attached to the upper and the lower base plates to maintain the plates at a fixed separation;
a pair of front wheels each mounted on one of the front supports and having an axis of rotation, the angle between the respective axes of rotations of each of the front wheels being less than 180°; and
a rear wheel mounted on the rear support and having an axis of rotation, the angle between the axis of rotation of the rear wheel and the axis of rotation of either front wheel being less than 180°.

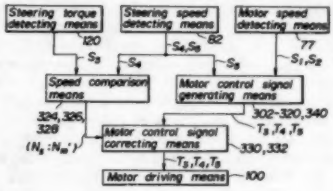
4,715,461

ELECTRIC POWER STEERING SYSTEM FOR VEHICLES

Yasuo Shimizu, Tochigi, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 21, 1986, Ser. No. 820,347
Claims priority, application Japan, Jan. 22, 1985, 60-9545; Jan. 22, 1985, 60-9546
Int. Cl.⁴ B62D *5/04*
U.S. Cl. 180—79.1 **8 Claims**





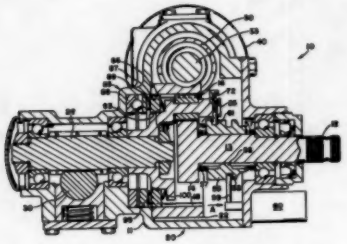
1. An electric power steering system for vehicles comprising:
an input shaft operatively connected to a steering wheel;
an output shaft operatively connected to a steered wheel;
an electric motor for operatively supplying auxiliary torque to said output shaft;
means for detecting steering torque acting on said input shaft;
means for detecting a steering speed of said input shaft; and
driving control means for feeding said electric motor with a drive signal based on output signals from said steering torque detecting means and said steering speed detecting means, said driving control means controlling said electric motor to produce said auxiliary torque and said driving control means controlling said electric motor to rotate at a speed in correspondence to said steering speed so that said rotational speed of said motor corresponds to said steering speed, said driving control means outputting a motor control signal and feeding said motor control signal to said electric motor, said driving control means including a motor driving means for receiving said motor control signal and for feeding said drive signal to said electric motor in accordance with said motor control signal, wherein
said driving control means determines an armature current necessary for the electric motor, depending on the output signal of the steering torque detecting means, and determines an armature voltage to be applied to the electric motor depending on a steering speed represented by the output signal from the steering speed detecting means and the armature current; and
the drive signal to be fed from the driving control means to the electric motor includes an armature voltage signal.

4,715,462

ELECTRIC POWER ASSISTANCE STEERING SYSTEM

Alistair G. Taig, South Bend, Ind., assignor to Allied Corporation, Morristown, N.J.

Filed May 29, 1986, Ser. No. 868,901
Int. Cl.[4] B62D 5/04; G05D 17/00
U.S. Cl. 180—79.1 32 Claims



1. An electric power assistance actuating system, comprising a casing housing a force step-up transmission having a rotary output member intended to be connected to a driven system to be actuated and a rotary input member intended to be connected to a drive system, and an electric motor providing power assistance for said rotary output member, characterized in that said input and output members are connected via a planetary gear mechanism wherein the input member actuates a sun gear engaging planetary gears supported by a carrier connected with said output member, the planetary gears disposed between said sun gear and a ring gear of said planetary gear mechanism, means responsive to rotation of said input member relative to said output member providing actuation of means for controlling operation of said electric motor, the electric motor driving a motor gear, said motor gear engaging teeth disposed on the periphery of said ring gear, so that rotation of the input member relative to the output member effects actuation of said electric motor which displaces rotationally said ring gear as said input member is rotated.

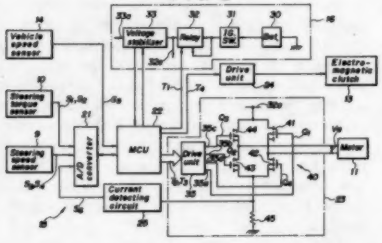
4,715,463

ELECTRIC POWER STEERING SYSTEM FOR VEHICLES

Yasuo Shimizu, Saitama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 4, 1987, Ser. No. 10,665
Claims priority, application Japan, Feb. 6, 1986, 61-25165
Int. Cl.[4] B62D 5/04
U.S. Cl. 180—79.1 2 Claims

FIG. 2



1. An electric power steering system for vehicles comprising a steering shaft, means for detecting a steering state of said steering shaft, an electric motor for supplying auxiliary torque to said steering shaft, and drive control means which receives an output signal from said steering state detecting means and executes a motor drive process for feeding said electric motor with a drive signal in accordance with said output signal and further executes a trouble-diagnostic process of said system, said drive control means including a micro-computer unit, wherein:

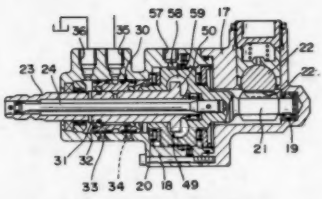
said system further comprises diagnostic proportion changing means which is operatively connected to said drive control means and changes the proportion of execution of said trouble-diagnostic process to said motor drive process in dependence on the vehicle speed.

4,715,464

POWER STEERING SYSTEM WITH HYDRAULIC REACTION

Keiichi Nakamura, Kariya, and Mikio Suzuki, Hekinan, both of Japan, assignors to Toyoda Koki Kabushiki Kaisha, Kariya, Japan

Filed Dec. 22, 1986, Ser. No. 944,507
Claims priority, application Japan, Dec. 27, 1985, 60-292792
Int. Cl.[4] B62D 5/08
U.S. Cl. 180—142 15 Claims



1. A power steering system which utilizes fluid source means for supplying pressure fluid of a constant flow rate and fluid motor means for supplementing manual steering torque, comprising:

a valve housing;

a rotatable output shaft partially positioned within said valve housing and operatively connected with said fluid motor;

a rotatable input shaft partially positioned within said valve housing, aligned with said output shaft and adapted for manual actuation;

servo-valve means located in said valve housing for distributing fluid flow to said fluid motor in accordance with relative rotation between said input and output shaft;

reaction means located in said valve housing for providing resistance against relative rotation between said input and output shaft in accordance with fluid pressure supplied thereto;

magnetic control valve means having a solenoid and connected to said reaction means for varying fluid pressure applied thereto in a predetermined range of pressure according to excitation of said solenoid in accordance with a vehicle operating condition; and

means incorporated in said magnetic control valve means for controlling said fluid pressure at a predetermined pressure

in said predetermined range when the current supplied to said solenoid becomes abnormal.

4,715,465

BODY CONSTRUCTION FOR MOTOR SCOOTER VEHICLES

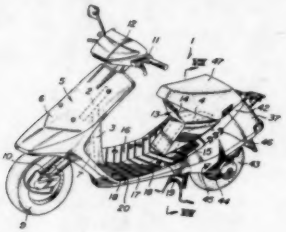
Shinji Takahashi, Tokyo, and Yoshinori Mita, Saitama, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 17, 1986, Ser. No. 820,433

Claims priority, application Japan, Jan. 17, 1985, 60-4342; Jan. 17, 1985, 60-4344; Mar. 22, 1985, 60-39766

Int. Cl.[4] B62K *11/00*

U.S. Cl. 180—225 **11 Claims**



1. A body construction in a motor scooter vehicle, comprising:

a vehicle frame assembly comprising a front frame having a head tube on a front end thereof and a rear frame;

a front cover covering said head tube and a front half portion of said front frame;

a central cover disposed around said rear frame, and comprising an upright portion surrounding said rear frame;

a floor panel having at least a portion formed as a unitary component with said central cover and disposed on a rear half portion of said front frame;

an engine positioned rearwardly of said rear frame and supported thereby, and an exhaust system extending from said engine; and

a pair of laterally spaced rear covers cooperating with said central cover in surrounding said engine and said exhaust system, said rear covers having portions extending forwardly and substantially covering sides of said floor panel and said portions being provided with a plurality of connecting means for connecting said rear covers to said floor panel.

4,715,466

FOUR WHEEL STEER CONTROL SYSTEM FOR FOUR WHEEL DRIVE VEHICLE, RESPONSIVE TO DRIVING TORQUE DISTRIBUTION

Katsumi Ishii, Sagamihara; Kanae Hirayama, Yamato; Yoshio Matsuoka, Tokyo, and Kotei Takahashi, Sagamihara, all of Japan, assignors to Nissan Motor Co., Ltd., Japan

Filed Nov. 18, 1986, Ser. No. 931,846

Claims priority, application Japan, Nov. 20, 1985, 60-260948

Int. Cl.[4] B60K *23/08*

U.S. Cl. 180—233 **14 Claims**

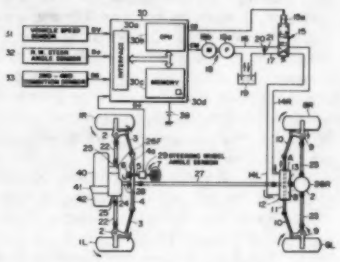
1. A vehicle comprising:

a four wheel drive system having a transfer for distributing a driving torque between a front wheel pair and a rear wheel pair, said transfer having means for varying a driving torque distribution between said front and rear wheel pairs,

a four wheel steer system for steering both of said front and rear wheel pairs, said four wheel steer system having means for steering said rear wheel pair in response to a control signal,

means for sensing said driving torque distribution, and

controlling means for varying a rear wheel steering ratio of a rear wheel steer angle to a steering wheel angle in accordance with said driving torque distribution sensed by said



driving torque distribution sensing means in such a manner as to maintain a steer characteristic of said vehicle substantially unchanged irrespective of change in said driving torque distribution, by manipulating said control signal.

4,715,467

CONTROL SYSTEM FOR A FOUR-WHEEL DRIVE VEHICLE

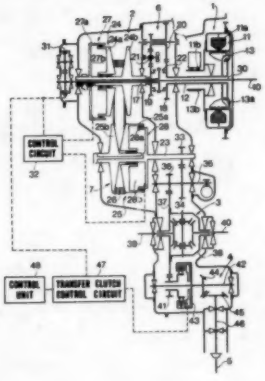
Yasuhito Sakai, Higashimurayama, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 20, 1985, Ser. No. 713,935

Claims priority, application Japan, Mar. 27, 1984, 59-59934; Mar. 27, 1984, 59-59935

Int. Cl.[4] B60K *17/34*

U.S. Cl. 180—247 **7 Claims**



1. In a control system for a switchable two-wheel drive four-wheel drive vehicle powered by an engine, the vehicle having a hydraulically operated automatic transmission for transmitting power of the engine to main driving wheels of the vehicle, auxiliary driving wheels, a hydraulically operated transfer clutch for transmitting the power of the engine to the auxiliary driving wheels for the four-wheel drive, a hydraulic circuit for controlling the transmission, said hydraulic circuit having a line pressure, and a hydraulic control circuit means for operating the transfer clutch, the improvement wherein:

said hydraulic control circuit means including a pressure regulator valve means for regulating the line pressure applied from the hydraulic circuit to the hydraulic control circuit means to a constant value, accumulator means for

accumulating oil from the line pressure of the hydraulic circuit for being supplied to the transfer clutch, control valve means having a spool for controlling said oil supplied to the transfer clutch providing clutch engaging pressure, said pressure regulator valve means for applying said constant value line pressure to one end of the spool of said control valve means, and solenoid operated valve means for controlling the spool of the control valve means by controlling the pressure of said constant value line pressure against the spool to control the clutch engaging pressure of the oil applied to the transfer clutch;

first means for detecting engine operating conditions and for producing a torque signal dependent on the engine operating conditions;

an electric circuit means for controlling said solenoid operated valve means, said electric circuit means including second means responsive to the torque signal for producing a clutch engage control signal, the magnitude of said control signal being dependent on engine torque; and

the clutch engage control signal being applied to the solenoid operated valve means to control the spool of the control valve means and beng such that the clutch engaging pressure decreases with a decrease of the engine torque.

4,715,468

DEVICE FOR CONTROLLING A ROLL BAR SERVING AS A SAFETY DEVICE FOR THE OCCUPANTS OF A MOTOR VEHICLE

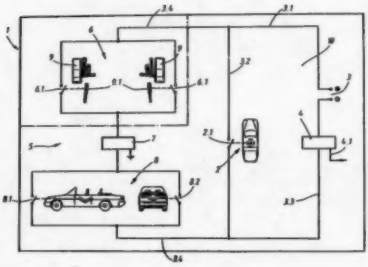
Karl-Heinz Baumann, Böblingen; Gerald Schick, Grafenau; Lothar Kassing, Nufringen; Alban Bossenmaier, Stuttgart, and Luigi Brambilla, Böblingen, all of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

Filed Dec. 23, 1986, Ser. No. 945,522

Claims priority, application Fed. Rep. of Germany, Dec. 23, 1985, 3545874

Int. Cl.[4] B60R *21/00*

U.S. Cl. 180—271 **8 Claims**



1. A device for actuating a safety device, in particular a roll bar, the device having first sensor means which output a first signal to cause the actuation of said safety device when a vehicle acceleration or deceleration exceeds a threshold value, said device comprising:

second sensor means for outputting a second signal upon sensing when at least one wheel suspension is fully extended;

third sensor means for outputting a third signal upon sensing tilting of said vehicle around at least one of a longitudinal axis and a transverse axis of said vehicle,

said safety device being actuated when both said second and third signals are outputted by said second and third sensor means.

4,715,469

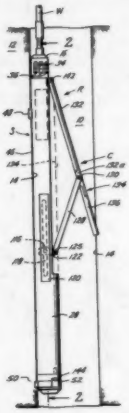
BOREHOLE SEISMIC RECEIVER

Arthur K. Yasuda, San Francisco; William S. Kennedy, Palo Alto, and Peter S. Aronstam, Cupertino, all of Calif., assignors to Petrophysical Services, Inc., Mountainview, Calif.

Filed Aug. 29, 1985, Ser. No. 770,796

Int. Cl.[4] G01V *1/40*

U.S. Cl. 181—102 **2 Claims**



1. A seismic receiver for use in a well borehole to sense the response of an earth formation adjacent the well borehole to seismic energy waves, comprising:

(a) geophone means for sensing the response of the earth formations to the seismic energy waves;

(b) sonde means for housing said geophone means, said sonde means having a substantially flat surface;

(c) means for releasably urging said sonde means into contact with the borehole wall along said substantially flat surface, said means comprising:

(i) a contact arm pivotally mounted at one end to said sonde means on the side opposite said substantially flat surface and movable between a retracted position adjacent said sonde means for movement through the borehole to a selected depth and an engaged position in firm contact with the borehole wall at the selected depth,

(ii) motor means for driving said contact arm between the retracted position and the engaged position,

(iii) clutch means mounted between said motor means and said contact arm enabling retraction of said contact arm in the event of failure of said motor means;

(d) said sonde means including rotatable means which allows the lower end portion of said sonde to rotate to firmly seat said sonde against the borehole wall despite wall irregularities.

4,715,470

DOWNHOLE ELECTROMAGNETIC SEISMIC SOURCE

Bjorn N. P. Paulsson, Fullerton, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Mar. 18, 1986, Ser. No. 841,073

Int. Cl.[4] G01V *1/40*

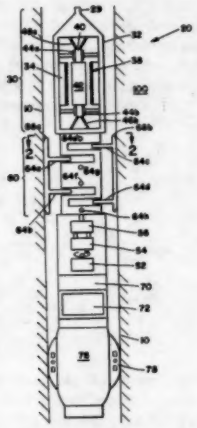
U.S. Cl. 181—106 **72 Claims**

52. A downhole seismic source comprising:

a housing;

a reaction mass within said housing;

a clamping means for coupling said housing securely within a wellbore; and



an electromagnetic actuator means within said housing for moving said reaction mass to create substantially pressure waves and shear waves.

4,715,471

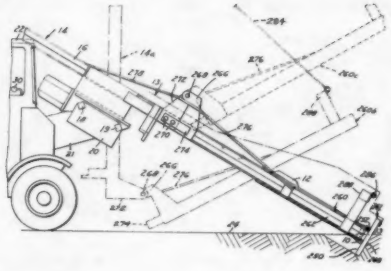
SELF-PROPELLED PERCUSSION UNIT AND METHOD OF USING SAME

David W. Fulkerson, 8360 W. Six Mile Rd., Northville, Mich. 48167, and Lawrence W. Smith, 26950 Taft Rd., Novi, Mich. 48050

Continuation of Ser. No. 830,022, Sep. 2, 1977, abandoned, which is a continuation-in-part of Ser. No. 625,141, Oct. 23, 1975. This application Apr. 17, 1979, Ser. No. 30,764

Int. Cl.⁴ G01V *1/04, 1/10*

U.S. Cl. 181—121 **4 Claims**



1. A method of generating seismic shear waves for subsurface geophysical exploration comprising the steps of locating a plate-like shock transmitting means on the earth surface such that a portion of said shock transmitting means having an impact face being exposed from above the earth surface, and said shock transmitting means having a second portion directed towards the earth and positioned on the earth surface at a preselected shear angle substantially less than 90° and greater than zero° with respect to horizontal, directing an impact hammer against said impact face of said shock-transmitting means with an impact force in a direction substantially equal to said preselected shear angle with respect to horizontal of said second portion of said shock transmitting means, said impact force substantially at right angles to said impact face of said shock-transmitting means and transmitting a shear wave and compression wave in the earth in response to said impact hammer contacting said shock transmitting means.

4,715,472

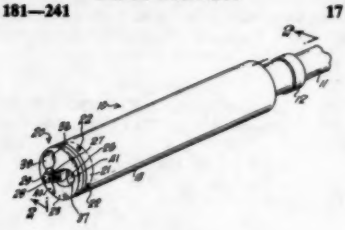
ADJUSTABLE MOTORCYCLE MUFFLER

J. Ward McKee, 7021 E. Alondra Blvd. #7, Paramount, Calif. 90723

Filed Sep. 2, 1986, Ser. No. 902,748

Int. Cl.⁴ F01N *1/18*

U.S. Cl. 181—241 **17 Claims**



1. An adjustable motorcycle muffler affixable to the exhaust pipe of a motorcycle, said muffler comprising:

a generally cylindrical muffler body affixable to the exhaust pipe of a motorcycle;

a perforated muffler pipe mounted in an axial manner within said muffler body, said perforated muffler pipe having a plurality of sound absorbing openings therethrough;

a stationary ring affixed to the exit end of the muffler body, said stationary ring having a plurality of longitudinally aligned openings therethrough;

an adjustable ring affixed to the stationary ring, said adjustable ring being movable to enlarge the gas flow path through the openings in the stationary ring, whereby the movement of the adjustable ring changes the exhaust gas flow resistance through the stationary ring so that the muffler may be tuned to provide an optimum amount of back flow resistance.

4,715,473

FOAM ACOUSTIC ABSORPTION MEMBER

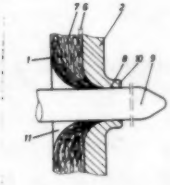
Rolf Tschudin-Mahrer, Lausen, Switzerland, assignor to Irbit Research & Consulting AG, Fribourg, Switzerland

Filed Dec. 11, 1985, Ser. No. 807,614

Claims priority, application Fed. Rep. of Germany, Dec. 14, 1984, 3445656

Int. Cl.⁴ E04B *1/82*

U.S. Cl. 181—286 **1 Claim**



1. In a foam, acoustic absorption member with area attachment between an air-pervious foam layer and a stabilizing layer provided with openings, the absorption member further comprising a support layer and the improvement wherein

the stabilizing layer with the support layer forms a hollow body having a front wall and a back wall defining a hollow space, said hollow space extending transversely along said front wall to allow conformance of said front wall, said foam layer and said support layer to an external surface, said front wall being pressed with thermal deformation against the foam layer, and

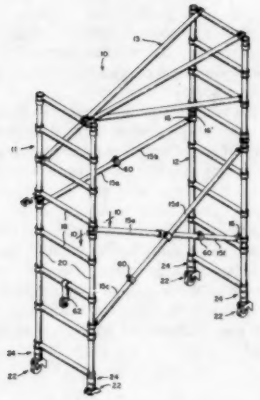
said openings comprise holes punched in said foam layer and in said stabilizing layer from the side of the foam layer, the hollow space between said front wall and said back wall being large enough to accommodate a collar which may be formed in said front wall about one of said openings.

4,715,474

SCAFFOLD SYSTEM

Donald T. Wehmeyer, 19026 - 171 Pl. NE., Woodinville, Wash. 98072

Filed Jul. 14, 1986, Ser. No. 885,945
Int. Cl.[4] E06C *7/50*
U.S. Cl. 182—194 **30 Claims**



1. An end fitting for a tubular member, comprising:

a one-piece body having a head and a neck projecting to an outer end from said head, circumferential portion of reduced circumference;

a porting ring sleeved on said neck and adjoining said head, said porting ring having exposed inlet and vent ports;

inlet and vent passages connecting said inlet and vent ports with the exterior of said central portion;

said body being adapted to have a tubular member sleeved on said neck into engagement with the porting ring whereupon adhesive may be introduced through the inlet port for filling the space between said central portion and the tubular member for securing the tubular member to said neck.

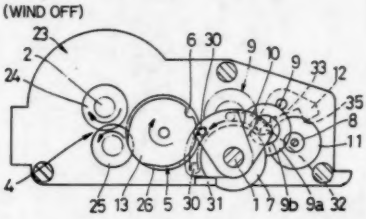
4,715,475

TWO-SPEED DRIVE MECHANISM FOR TOYS

Ishida Minoru, 8-302, Ikenohata 4-Chome 8, Taito-ku, Tokyo, Japan

Filed Jul. 14, 1986, Ser. No. 884,901
Claims priority, application Japan, Nov. 30, 1985, 60-184659[U]
Int. Cl.[4] F03G *1/08*; A63H *29/04, 31/00*
U.S. Cl. 185—39 **2 Claims**

1. In a two-speed drive mechanism for toys said mechanism being provided with a gear mechanism interconnecting an output shaft and a spiral spring shaft fixed with one end of a spiral spring, a cam having a recess part is provided so as to be engaged with said spiral spring shaft and rotated through a group of interconnecting gears, an intermediate member being provided to interlock with said cam and engage therewith and change its position in the same direction as when the recess part of said cam moves upwardly from below through the winding up of said spiral spring, said intermediate member having an intermediate gear to interconnect the gear on said output shaft and a low-speed gear, an anchor being provided to swayingly engage with an gear coaxial with said low-speed gear and to rotate said gear tooth by tooth, said cam having a projection for contacting said intermediate member from



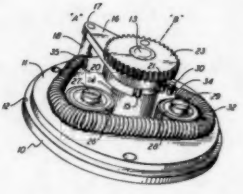
below to keep the position of said intermediate member when it is on the low-speed side, and furthermore, in order to prevent said spiral spring winding up force from being transmitted further beyond said cam in that state a ratchet mechanism being incorporated in said group of interconnecting gears so that the rotational speed of said output shaft may be varied at the time before and after said cam changes its position reversely to its previous position when said cam moves downwardly from above by the release of said spiral spring and said recess part of said cam engages with said intermediate member.

4,715,476

RESET MECHANISM RESPONSIVE TO LOSS OF TORQUE

Howard G. France, Watertown, Conn., assignor to North American Philips Corporation, New York, N.Y.

Filed Sep. 26, 1986, Ser. No. 913,174
Int. Cl.[4] F03G *1/00*
U.S. Cl. 185—40 R **7 Claims**



1. A reset mechanism responsive to loss of torque comprising

a base;

an arm rotatable about an arm axis through said base, said arm being rotatable through an arc from a first angular position to a second angular position, said arm extending radially from said axis to a distal end;

first bearing means on said base substantially opposite said arm axis from said second angular position;

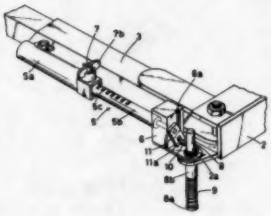
an extension spring fixed at one end to a fixing point on said base and at its other end to a fixing point on said arm spaced from said arm axis, said spring extending around said first bearing means, said spring forming a first angle with said arm when said arm is in said first position, said spring forming a second angle with said arm when said arm is in said second position, said second angle being substantially smaller than said first angle.

4,715,477

DEVICE FOR FIXING SWING ARM USED FOR APPARATUS FOR LIFTING AUTOMOBILES FOR REPAIR

Koichi Suzuki, Aichi, Japan, assignor to Sugiyasu Industries Co., Ltd., Aichi, Japan

Filed Jul. 18, 1986, Ser. No. 887,246
Claims priority, application Japan, Aug. 23, 1985, 60-129429[U]
Int. Cl.[4] B66F 7/28
U.S. Cl. 187—8.47 1 Claim



1. In an apparatus for lifting automobiles for repair thereof, comprising a pair of spaced posts, each post having a carriage which is connected thereto for vertical movement; a pair of horizontal swing arms pivotally connected to each carriage for swinging movement in a horizontal plane, each swing arm having a car body support means at its one end, and a device for temporarily fixing the swing arm in its desired horizontal position so as to temporarily fix the two swing arms with a desired angle therebetween, which device comprises (A) a horizontal hollow cylinder connected to one side of the swing arm at its one end portion and extending along a swing arm and (B) a horizontal cylindrical solid rod which is disposed along the swing arm in alignment with said hollow cylinder and is rotatably and slidably supported in the other end portion of said hollow cylinder at its one end portion, and which is connected, at its other end, to a horizontal bracket projecting from the carriage toward the same side as said solid rod and hollow cylinder in the vicinity of the section of the carriage pivotally connecting swing arm thereto, and which is provided with a plurality of transverse slots formed on a portion of the circumference of said solid rod substantially parallel to one another and along the lengthwise direction thereof, said hollow cylinder being provided with a lock means for engaging one of said slots for temporarily fixing the swing arm in a desired horizontal position, wherein the improvement comprises:

a. a vertical rod means adapted for vertical movement and rotation about its vertical axis, said rod means being downwardly biased by a biasing means and extending vertically through said horizontal bracket, said rod means having a lower end disposed in a position lower than said carriage;

b. a means for supporting said horizontal rod and for facilitating the rotation of said horizontal rod upon the vertical movement of said vertical rod means;

c. means responsive to the movement of said vertical rod to its lowest position relative said carraige for rotating said horizontal rod to a position where one of said slots of said horizontal rod engages said lock means; and

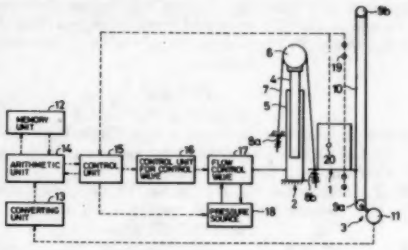
d. means for effecting the disengagement of said lock means and said slot on said horizontal rod upon the lowering of said carriage beyond a predetermined level.

4,715,478

HYDRAULIC ELEVATOR

Ichiro Nakamura, Katsuta; Satoshi Kobayashi, Yokohama, and Eiichi Sasaki, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Nov. 7, 1986, Ser. No. 928,327
Claims priority, application Japan, Nov. 25, 1985, 60-262414
Int. Cl.[4] B66B 1/26
U.S. Cl. 187—111 5 Claims



1. In a hydraulic elevator of the type which has a cage, a hydraulic jack, a hydraulic pressure source, a flow control valve and a control device, and in which a flow of a pressure fluid to be supplied to or discharged from the hydraulic jack is controlled thereby to raise or lower the cage directly or indirectly,

the hydraulic elevator comprising:

detection means for obtaining an actual running velocity of the cage during acceleration,

memory means for storing a predetermined reference running velocity,

arithmetic means for calculating a command velocity during deceleration from said reference running velocity and the difference between said actual running velocity and a running velocity under a reference operating condition, and

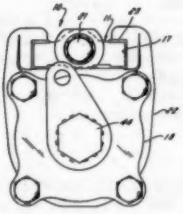
drive means driven in response to said command velocity so as to cause the cage to have a floor arrival running time close to a predetermined value.

4,715,479

RETRACTION TYPE SUPPORT ASSEMBLY FOR A FLOATING CALIPER DISC BRAKE

James A. V. Buckley, Whitefish Bay, Wis., assignor to Hayes Industrial Brake, Inc., Mequon, Wis.

Filed Jun. 17, 1986, Ser. No. 875,295
Int. Cl.[4] F16D 55/02, 65/14
U.S. Cl. 188—71.8 15 Claims



1. A support assembly for mounting a floating caliper-disc brake on a frame, the brake being of the type including a caliper for bridging a disc, said caliper having a rectangular mounting slot, a first friction pad supported by said caliper on one side of the disc, a housing supported by said caliper on the other side of the disc and having a bore and a second friction pad mounted in said bore for movement into engagement with

the other side of the disc, said brake support assembly comprising a rectangular mounting block having a pair of stabilizing bosses at one end and an opening through the center, and a bolt positioned in said opening for securing said block to the frame with the bosses positioned in holes provided in the frame, said mounting block being adapted to be mounted in said rectangular mounting slot of said caliper whereby said caliper is free to float on said block when the second friction pad is moved into engagement with the disc to move the first friction pad into engagement with the opposite side of the disc, and spring means located between said block and said caliper for retracting said caliper to release said first friction pad from the disc when said second friction pad is moved away from the disc.

4,715,480

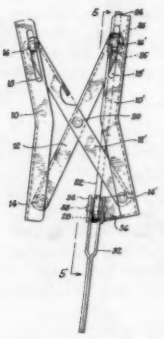
TANDEM WHEEL CHOCK

Milan B. Anderson, deceased, late of Chula Vista, Calif. (by Thelma Anderson, administratrix), assignor to Hewitt Tubular Products, Inc., San Diego, Calif.

Continuation of Ser. No. 778,228, Sep. 19, 1985, abandoned. This application Mar. 30, 1987, Ser. No. 33,044

Int. Cl.[4] B60T *3/00*

U.S. Cl. 188—74 **6 Claims**



4. In combination with a pair of tandem wheels placed one behind the other on one side of a vehicle, a wheel chock assembly which comprises:

expandable means horizontally bridging the shortest distance between said wheels, having:

a first shoe applied against one wheel;

a second shoe applied against the other wheel;

said shoes being generally bar-shaped and in a vertical, parallel, spaced-apart relationship, each shoe having a fixed pivot and a vertical slot distance from said pivot;

horizontally contracting and expanding means including:

a pair of cross-braces pivotally connected at midpoint in a scissor-like configuration;

a fixed end on each of said braces being pivotally connected to the fixed pivot of one shoe, and a sliding other end of said brace being slidably engaged into the slot of the other shoe; and

means for adjusting the position of one of said sliding ends within its engaged slot.

4,715,481

HYDRODYNAMIC RETARDER

Klaus Brosius, Heidenheim, Fed. Rep. of Germany, assignor to J. M. Voith GmbH, Heidenheim, Fed. Rep. of Germany

Filed Mar. 13, 1986, Ser. No. 839,335

Claims priority, application Fed. Rep. of Germany, Mar. 30, 1985, 3511795

Int. Cl.[4] F16D *57/02, 33/00;* **F16M** *3/44*

U.S. Cl. 188—291 **13 Claims**

1. A hydrodynamic retarder, having two independent operating circuits in a common housing comprising:

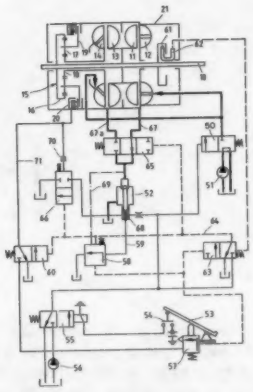
(a) a first toroidal operating circuit formed from a first row of rotor blades connected to a retarder shaft and from a stationary row of stator blades; and

(b) a second toroidal operating circuit formed from a second rotor with a second row of rotor blades connected to the retarder shaft and a rotatable stator with a pivoted second row of stator blades

wherein the improvement comprises:

(c) the rotatable stator of the second operating circuit is connected to the retarder shaft via a reversing gear unit which drives the rotatable stator in the opposite rotational direction to that of said first row of rotor blades;

(d) the reversing gear has step-up gearing for the rotatable stator;



(e) the reversing gear is provided with a coupling device mounted on said housing, said coupling device providing a releasable connection between the rotatable stator and the retarder shaft;

(f) the rows of blades of the first operating circuit are inclined towards the axis of rotation of the second rotor, and the rows of blades of the second operating circuit are substantially symmetrical to the axis of rotation of the first rotor; and

(g) a valve device to activate the second operating circuit, which valve device is provided to lower the pressure limit of an overflow valve with which the second operating circuit can be temporarily emptied throughout the duration of a switching on operation in the coupling device between the retarder shaft and the second stator.

4,715,482

METHOD AND APPARATUS FOR CONTROLLING AN ELECTROMAGNETIC CLUTCH FOR USE ON A VEHICLE

Tomoyuki Watanabe; Takashi Shigematsu; Setsuo Tokoro, and Takashi Hayashi, all of Susono, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Filed Jul. 15, 1985, Ser. No. 754,949

Claims priority, application Japan, Nov. 20, 1984, 59-244900; Apr. 3, 1985, 60-70615

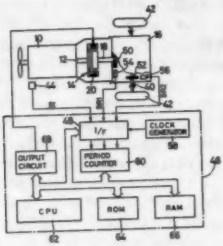
Int. Cl.[4] F16D *37/02;* **B60K** *41/02*

U.S. Cl. 192—0.032 **11 Claims**

1. A method of controlling an electromagnetic clutch incorporated in a power transmission system of a vehicle to transmit an output of an engine to drive wheels of the vehicle, so as to absorb a variation in output torque of the engine, said method comprising the steps of:

detecting a variation in rotating speed or torque of an output shaft of said electromagnetic clutch; and controlling an engaging action of said electromagnetic clutch to adjust a

clutch torque transmitted by said clutch, based on whether the detected variation in rotating speed or torque



of said output shaft of said electromagnetic clutch is synchronized with an ignition period of said engine.

4,715,483

ANTI-ROLL BACK DEVICE

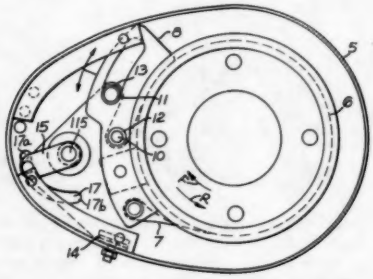
Keith J. Hobson, 23 Charnock Wood Rd., Sheffield S12 3HL, and Brian Hartley, 51 Hady Crescent, Hady Hill, Chesterfield, both of England

Filed Apr. 8, 1986, Ser. No. 849,545

Claims priority, application United Kingdom, Apr. 9, 1985, 8509022

Int. Cl.[4] B60K *41/28, 41, 26*

U.S. Cl. 192—4 A **14 Claims**



1. A device for the selective prevention of the rotation of a rotatable member in one only of its two directions of rotation, comprising: an end fitting slidably mounted in close proximity to the rotatable member for movement between an upper position and a lower position and supporting first and second spaced pin means; elongate belt means attached by one end thereof to the end fitting and extending around the rotatable member, the other end of the belt means extending below said first pin means on the end fitting and over said second pin means on the end fitting and to an anchor point; crank means pivotally mounted in closely spaced relation to the rotatable member, around which the belt means passes on its passage from said second pin means on the end fitting to the anchor point; means for selectively pivoting said crank means between a first position where it acts on the belt means to put the belt means in a condition where rotation of the rotatable member in a first, forward, direction is permitted and rotation in a second, reverse direction is instantly prevented, and a second position where the belt means is in a condition where rotation of the rotable member in said reverse direction is permitted, and means to hold said cranked means in said second position until said rotatable member has ceased its rotation in said second, reverse, direction.

4,715,484

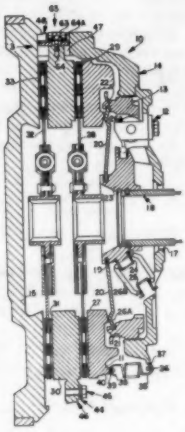
AUTOMATIC INTERMEDIATE PLATE POSITIONER

Richard A. Flotow, Butler, Ind., assignor to Dana Corporation, Toledo, Ohio

Filed Dec. 17, 1986, Ser. No. 942,782

Int. Cl.[4] F16D *13/75*

U.S. Cl. 192—70.25 **6 Claims**



1. A friction clutch having an axis of rotation and including in combination, a clutch cover assembly secured to a flywheel, said clutch cover surrounding a pair of axially spaced pressure members with the pressure member farthest from the flywheel being a pressure plate and the pressure member closest to the flywheel being an intermediate plate, a pair of driven discs with one disc being disposed between said pair of pressure members and the other disc disposed between the intermediate plate and said flywheel, clutch engaging spring means acting between said cover means and said pressure plate for biasing said pressure plate toward said flywheel and engaging said pressure members and said driven discs and said flywheel in driving relationship, a throwout bearing for withdrawing said clutch engaging spring load, a first spring return means for returning said pressure plate to its disengaged position with said first spring return means imposing a much lower load than said clutch engaging spring means, second spring return means for returning said intermediate plate to its disengaged position in a spaced relationship to said other driven disc and further removed from said flywheel than its position relative to said flywheel when in its engaged position, said second spring return means imposing a much lower load than said clutch engaging spring means on said intermediate plate, a plurality of drive lugs on said intermediate plate extending radially outwardly therefrom and having a bolt hole in the periphery thereof, a plurality of drive slots in said clutch cover with each receiving a drive lug in a driving relationship for imposing rotational loads thereon about said clutch axis, each of said slots being open in the direction facing said flywheel and each slot having a rear face opposed to and facing said flywheel and each slot having a pair of circumferentially opposed driving faces, a positioning means mounted on the radially outer surface of each of said drive lugs, said positioning means including a friction member which is longer in the axial direction than the lug mounting the same while being of the same circumferential size, said friction member having an axially elongated slot therein, the forward end of said friction member engaging said flywheel upon clutch engagement to position said friction means on said drive lug and being engageable with said rear face of said drive slot upon clutch disengagement for positioning said intermediate plate, said positioning means also including a lock strap which has a central hole therein overlying the slot in said friction member and has a pair of circumferentially

extending ends engageable with said driving faces of said drive slots, said lock strap having a pair of bendable axially extending tangs thereon, a positioning means spring disposed on said lock strap with an aperture therein aligned with the hole in the lock strap, and a bolt passing through said positioning means spring, said lock strap and said friction means and threaded into the bolt hole in the periphery of each of said drive lugs, said bolt being adjustable to adjust friction between said positioning means friction member and the drive lug carrying the same, said axially extending tangs on each of said lock straps being bendable radially outwardly to engage and prevent rotation of the bolt received in said positioning means, said bolts of all said positioning means adjusting the friction between said friction members and said lugs so that the total load on said lugs is greater than said second spring return means but less than the load on said pressure members imposed by said clutch engaging spring means.

4,715,485

CLUTCH DISC FOR A MOTOR VEHICLE FRICTION CLUTCH

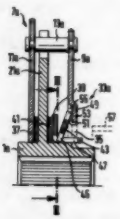
Günther Rostin, Schweinfurt; Dagwin Tomm, Kaiserslautern, and Franz Hartig, Dittelbrunn, all of Fed. Rep. of Germany, assignors to Fichtel & Sachs AG, Schweinfurt, Fed. Rep. of Germany

Filed Mar. 15, 1985, Ser. No. 712,354

Claims priority, application Fed. Rep. of Germany, Mar. 17, 1984, 3409829

Int. Cl.[4] F16D *3/14, 3/66, 13/75*

U.S. Cl. 192—106.2 **4 Claims**



1. Clutch disc for a motor vehicle friction clutch comprising:

(a.) a hub (1);

(b.) a friction lining carrier (7) supported on said hub, said friction lining carrier being rotatable relative to said hub through a limited angle of rotation about the rotational axis (5) of said hub;

(c.) a torsional vibration spring damper arranged in a torque transmission path between said hub and said friction lining carrier, said friction lining carrier comprising an essentially radially extending first disc part means (9, 11), said first disc part means comprising a first disc (9) and a second disc (11) rigidly connected with each other and axially spaced from each other, a second disc part means (21) secured to and extending essentially radially outwardly from said hub and arranged axially between the first and second discs (9, 11), said spring damper comprising at least one damping spring (31) arranged in windows (25, 27, 29) of said first and second disc part means (9, 11, 21) which is stressable upon relative rotation of the first and second disc part means (9, 11, 21);

(d.) a torsional vibration friction damper (33) with at least one axially acting preloaded spring (43) axially arranged between said second disc part means (21) and said first disc (9) of said first disc part means to be co-axial with same, and at least one friction ring (37, 41) arranged in an abutment force path of said preloaded spring (43) axially between one (9) of said first and second discs and said second disc part means and arranged co-axial therewith;

(e.) an adjustment device (49, 53) arranged in the abutment force path of said preloaded spring, by means of which the axial spacing between a radially outer edge region and a radially inner edge region of the preloaded spring (43) is adjustable wherein the preloaded spring (43) is rotatable about the axis of rotation (5) relative to said first disc (9) of said first disc part means for the adjustment, said preloaded spring having several support tongues (49) spaced apart in circumferential direction, said first disc (9) having axial abutment steps (53) arranged in groups with each group corresponding to a respective one of the individual support tongues (49), so that the support tongues (49) rest on selected ones of said abutment steps, wherein said support tongues (49) are spaced from one another corresponding to the angular extent of each of said groups;

and wherein snap-in shoulders (55) extending in a circumferential direction of said first disc (9) are provided between each of the abutment steps (53) in at least one of the groups of abutment steps (53), which lock the preloaded spring (43) through the support tongues (49) so that the preloaded spring does not rotate relative to said first disc (9) of said first disc part means.

4,715,486

LOW-WEAR FRICTIONALLY ENGAGING DEVICE

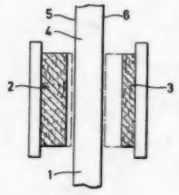
Jochen Burgdorf, Offenbach-Rumpenheim, and Helmut Weisbrod, Nauheim, both of Fed. Rep. of Germany, assignors to International Standard Electric Corporation, New York, N.Y.

Filed Aug. 5, 1981, Ser. No. 290,117

Claims priority, application Fed. Rep. of Germany, Sep. 30, 1980, 3033139

Int. Cl.[4] F16D *13/60, 65/02, 69/02*

U.S. Cl. 192—107 M **8 Claims**



1. In a frictionally engaging device, especially a friction brake, friction clutch, and the like, a combination comprising

at least one first and at least one second friction element engageable with one another for surface to surface engagement,

said first element being of a relatively high-wear friction material containing an organic binder,

said second element being of a relatively low-wear material containing iron and having at least one friction surface facing said first element for engagement therewith; and

a wear-reducing coating uniformly applied to at least one friction surface of said second element, said coating comprising a substantial proportion of tungsten carbide.

4,715,487

CHUTE FOR OPTICAL SELECTOR

Nobuo Saika, Wakayama, Japan, assignor to Toyo Seimaiki Seisakusho K. K., Wakayama, Japan

Continuation of Ser. No. 748,203, Jun. 24, 1985, abandoned. This application Nov. 10, 1986, Ser. No. 928,589

Claims priority, application Japan, Dec. 28, 1984, 59-280043

Int. Cl.[4] B07C *5/342*

U.S. Cl. 193—2 R **11 Claims**

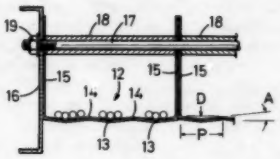
1. A chute for feeding falling articles of a size no greater than that of sliced almonds in a linear manner especially to an optical selector, comprising:

an upper infeed end and a lower discharge end, said lower

discharge end being inclined at an angle from the vertical from said upper infeed end,

a bottom surface extending from said upper infeed end to said discharge end and providing a generally linear path for the falling articles,

said bottom surface being gently corrugated along its width to provide a series of shallow valleys separated by low



ridges extending generally the length of said bottom surface from said upper infeed end to said lower discharge end, the inclination of said corrugations being in the range of 1°-20°,

the distance between said ridges ranging from 5 mm to 30 mm and the depth of said valleys from the top of said ridges ranging from 0.1 mm to 5 mm.

4,715,488

COLLAPSIBLE CONVEYOR

Timothy W. Hewitt, 18 Kensington, Pleasant Ridge, Mich. 48069, and William V. Hewitt, 1103 Park St., Royal Oak, Mich. 48067

Filed Jan. 24, 1986, Ser. No. 822,477
Int. Cl.[4] B65G *13/00*
U.S. Cl. 193—35 R **9 Claims**

1. A collapsible conveyor for article handling comprising:

an elongated frame;

means secured to said frame for displaceably supporting articles;

a pair of substantially identical legs;

means for pivotally securing said legs to opposite ends of said frame so that said legs are pivotable between a first position in which said legs lie substantially parallel to and adjacent to said frame and a second position in which the legs extend substantially perpendicular away from said frame,

wherein each leg comprises an elongated first leg member and an elongated second leg member, said first leg member being hollow and having a rectangular cross sectional shape,

said second leg member being telescopically slidably received in one end of said first leg member, said second leg member having three sides which flatly abut against three internal sides of the first leg member and a fourth side which longitudinally tapers along said second leg member so that a space is formed between the fourth side of said second leg member and the fourth side of said first leg member, said space decreasing in size as the insertion of the second leg member into the first leg member increases, and

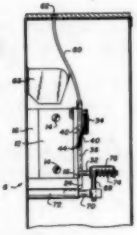
means for locking said leg members together at an adjusted position comprising a plate, means for freely pivotally securing said plate to said first leg member about an axis transverse to the axis of said first leg member and so that said plate depends from said plate pivotal securing means, and means for adjustably locking the pivotal position of said plate so that an edge of said plate abuts against said fourth side of said second leg member and prevents the further insertion of said second leg member into said first leg member.

4,715,489

DISK OPERATED PLASTIC BAG DISPENSER

Loreto Verrelli, Burnaby, Canada, assignor to EBCO Industries Ltd., Canada

Filed Jun. 20, 1985, Ser. No. 747,087
Int. Cl.[4] G07F *11/00, 5/02*
U.S. Cl. 194—256 **9 Claims**



1. A disk operated mechanism comprising:

a first pivotable member;

a first lever formed on the first pivotable member;

a first stop to restrict pivoting of the first pivotable member, said first stop including means to permit its movement to allow pivoting of the first pivotable member past the first stop, said means to permit movement comprising a limb extending downwardly from the first stop, a second lever to contact the limb to move the stop out of contact with the first pivotable member and means urging the stop back into contact with the first pivotable member;

resilient means urging the first pivotable member against the first stop;

a second pivotable member, spaced from the first;

a second stop to restrict pivoting of the second pivotable member;

resilient means urging the second pivotable member against the second stop;

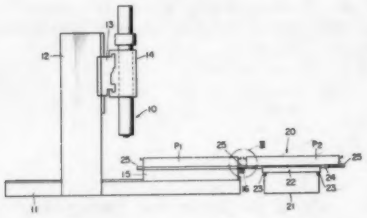
co-operable stops on the first and second members able to abut each other to prevent the first member pivoting by more than a predetermined amount when a force is applied to the first lever;

but the first and second members being spaced apart by an amount that allows a disk of predetermined size to be received between them, whereupon a force supplied to the first lever, and thus the first member, is transmitted by the disk to the second member to pivot the second member sufficiently to ensure the co-operable stops do not abut when the first member is pivoted and thus do not restrict further movement of the first lever.

4,715,490
AUTOMATIC PALLET CHANGER

Takao Date, Kannami; Masaru Okumura, and Koya Watanabe, both of Numazu, all of Japan, assignors to Toshiba Kikai Kabushiki Kaisha, Chuo, Japan

Filed Apr. 21, 1986, Ser. No. 853,917
Claims priority, application Japan, Apr. 26, 1985, 60-88965
Int. Cl.[4] B65G *47/00*
U.S. Cl. 198—346.1 **3 Claims**



1. An automatic pallet changer for replacement of pallets automatically between a pallet magazine storing a plurality of pallets and a pallet table of a machine tool, said pallet changer comprising:

a rack fixed on the rear of each pallet parallelly to the direction in which the pallet is shifted for said replacement;

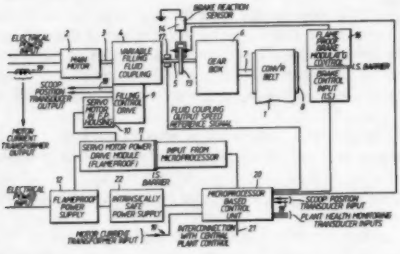
a pallet driving pinion engaging with said rack disposed on a side end of said pallet table facing the pallet magazine; and

pinion driving means for driving said pallet driving pinion.

4,715,491
HIGH INERTIA LOAD DRIVES AND CONTROLS THEREFOR

John Elderton, Hampton Hill, England, assignor to AE PLC, Rugby, England

PCT No. PCT/GB85/00177, § 371 Date Dec. 2, 1985, § 102(e) Date Dec. 2, 1985, PCT Pub. No. WO85/05088, PCT Pub. Date Nov. 21, 1985
PCT Filed Apr. 25, 1985, Ser. No. 809,886
Claims priority, application United Kingdom, Apr. 30, 1984, 8411019
Int. Cl.[4] F16D *67/06*; B60K *41/28*
U.S. Cl. 198—856 **16 Claims**

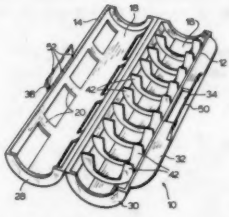


1. Apparatus for driving a high-inertia load from a prime mover, the apparatus comprising a brake for holding the load stationary, reaction sensing means for indicating the reaction exerted by the brake on the load, a variable filling fluid coupling having its input connected to the prime mover and its output connected to the brake and load, the coupling having filling control means responsive to external control signals for starting and stopping the load, the filling control means being responsive to the brake reaction sensor and to the speed of the load in such a manner as, on receipt of a start-up signal, to release the brake under control such as to maintain a desired acceleration rate, and to start filling the fluid coupling such that the effect of such filling lags behind the restraining torque of the brake if the load is acting on it in the forward direction, but if the load is acting in the backward direction to maintain the brake engaged and cause the filling control means to increase the filling of the coupling until the driving torque exerted through the coupling reduces or eliminates the backward reaction sensed by the brake reaction sensor and thereafter to release the brake and progressively increase the coupling filling while monitoring the transmitted torque, until the working speed is attained, the control means being responsive to a stop signal to progressively reduce the coupling filling and to apply the brake while monitoring the torque exerted on the load to maintain it below a predetermined value.

4,715,492
HINGED COIN HOLDER

Gordon W. Holmes, Toronto, Canada, assignor to Professional Packaging Limited, Mississauga, Canada

Continuation-in-part of Ser. No. 600,985, Apr. 16, 1984, Pat. No. 4,541,528. This application Sep. 13, 1985, Ser. No. 775,794
Claims priority, application Canada, May 4, 1983, 425138
The portion of the term of this patent subsequent to Sep. 17, 2002, has been disclaimed.
Int. Cl.[4] B65D *85/62, 8/04*
U.S. Cl. 206—0.83 **26 Claims**



19. In a holder for disc-like objects constructed of polymeric material and formed by molding as an integral element, comprising an elongate hollow cylindrical body having a generally circularly cross-section of diameter substantially that of the disc-like objects to be packaged therein and formed of two semi-circularly cross-sectioned portions joined together at one common edge and releasably joined together by releasable locking means at the other common edge to enable opening of said body to occur at the other common edge to gain access to the interior of the body, the improvement wherein said releasable locking means comprises:

at least one wedge-shaped upwardly-extending projection provided at and tapering towards the arcuate extremity of a resiliently-flexible tongue extending from adjacent the midpoint along the length of one curvilinear extremity of the body,

a slot having a length slightly greater than the transverse dimension of the tongue and formed in an upright flange extending from the other curvilinear extremity of the body in a plane which substantially passes through the body hinge line, and

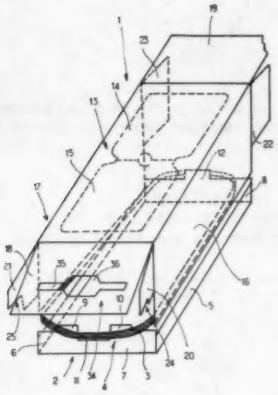
a deflector bar extending perpendicularly to the flange towards said tongue at the upper extremity of said slot to deflect said wedge-shaped projection downwardly to guide the tongue into the slot until the projection clears the edge of the slot and said tongue springs up to establish engagement between the rear edge of the wedge-shaped projection and the adjacent surface of the flange to prevent withdrawal of the tongue through the slot and opening of the holder until the tongue is depressed so that the rear edge of the projection is free from the flange.

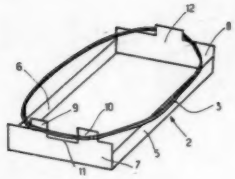
4,715,493

COMPOSITE PACKAGE FOR A GROUP OF CONTAINERS

Roger Dreyfus, Strasbourg, France, assignor to ICP S.A., Fegersheim, France

Filed Oct. 27, 1986, Ser. No. 923,337
Int. Cl.[4] B65D 5/46
U.S. Cl. 206—200 8 Claims





1. A composite package for a group of articles, comprising a substantially tray-shaped bottom portion having a bottom wall and a plurality of upstanding edge walls which include a front edge wall and a rear edge wall having respective upper edges and which confine the group of articles supported on the bottom wall;

a cover portion connected to said bottom portion in an assembled condition of the package to cover said bottom portion and the group of articles and including including a front wa11 which includes a front panel having an opening and two lugs extending along said front panel in a closed position of said front panel;

an elongated endless strap received in the package and loosely surrounding the group of articles in the assembled condition of the package; and

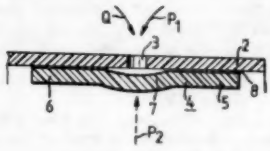
means at said upper edges of said front and rear edge walls for holding said strap in position on said bottom portion, said holding means said front edge wall defining with said lugs, respective slots for the passage of said strap therethrough and through said opening of said front panel between the interior and the exterior of the package in said assembled condition of the package and said closed position of said front panel for the strap to form a handle at the exterior of the package.

4,715,494

INTERNALLY PRESSURIZED PACKAGE WITH HEAT-SEALABLE CLOSURE MEMBER

Hans Heitzenröder, Langenselbold, and Eckhard Merz, Lich, both of Fed. Rep. of Germany, assignors to Dunlop Limited a British Company, United Kingdom

Filed Mar. 4, 1986, Ser. No. 836,124
Claims priority, application Fed. Rep. of Germany, Mar. 13, 1985, 3509027
Int. Cl.[4] B65D 81/20
U.S. Cl. 206—213.1 7 Claims



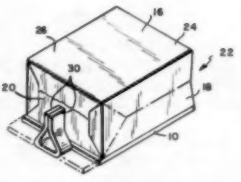
1. A pressure-tight packaging made of tubular flexible plastic material having sealed ends, with an initially heated gas contained therein and means to enable pressurizing and maintaining a gas pressure in said pressure-tight packaging without disturbing said sealed ends, said means comprising an opening in one packaging wall remote from the sealed ends of said pressure-tight packaging and a means for sealing said opening, said means comprising an elongated closure member for said opening said closure member comprising an imperforate material which is heat sealable at the temperature of the initially heated gas used to pressurize said container, said closure member being of planar configuration and being first attached by its opposed ends to the inner surface of said wall adjacent said opening to overlie said opening but defining a passage between said closure member and the wall immediately adjacent to the opening so as to permit gas entering said opening to enter said closed container, the positioning of the closure member in relation to the inner surface of the wall being such that when said container is internally pressurized with the gas at a temperature sufficient to activate said heat-sealable material and a pressure sufficient to urge said closure member against said opening, a permanent seal is formed.

4,715,495

DISPOSAL KIT

Herbert W. Henry, 4 West St., Cambridge, Mass. 02139

Filed Oct. 22, 1986, Ser. No. 921,430
Int. Cl.[3] B65D 69/00
U.S. Cl. 206—223 1 Claim



1. A disposable kit for picking up animal litter and disposing of the same, comprising, in combination, a stiff cardboard panel of rectangular configuration, a foldable paper bag of the kind wherein the bottom is foldable relative to the sides into parallel relation therewith, said foldable paper bag being attached to one surface of the panel such as to be collapsible into parallelism with the panel prior to use and to be distendible for use with the open end adjacent one end of the panel, said panel being of a length such as to extend from the open end of the

bag to and beyond the closed end of the bag and defining at the closed end of the bag an extension of a width corresponding to the width of the bag, said extension containing slits parallel to the closed end of the bag extending from the opposite edges of the panel toward the center, but terminating short of the center such as to define a pair of tabs connected to the panel and foldable relative to the panel along lines parallel to the closed end of the bag to positions generally perpendicular to the panel and at right angles to the bottom of the bag, said tabs, when folded, providing a handle for holding the bag in a position to receive the litter, a flat cardboard panel corresponding to substantially the transverse width of the bag for scooping litter into the open end of the distended bag and a sanitary bag within which the collapsed bag and scoop can be stored prior to use and disposed of after use.

4,715,496

SHOE POLISH CAN

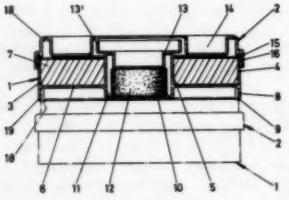
Ludger Hackmann, Lohne/Oldenburg, Fed. Rep. of Germany, assignor to Bramlage Gesellschaft mit beschränkter Haftung, Lohne/Oldenburg, Fed. Rep. of Germany

Filed Jan. 21, 1986, Ser. No. 820,867

Claims priority, application Fed. Rep. of Germany, Jan. 24, 1985, 8501716[U]

Int. Cl.[4] B65D *81/22, 69/00*

U.S. Cl. 206—229 **15 Claims**



1. A can for storage of shoe polish and similar paste materials, the can comprising

a housing having a bottom and a removable closure lid disposed opposite said bottom, and being configured for retention of an integrated applicator having an applicator handle,

an outer wall and an inner wall upstanding from said bottom and defining a paste containing space; and wherein

said paste containing space is formed as an arcuate trough, said outer wall extends to meet said lid for closing off said paste containing space, said inner wall having an arcuate form to enclose a space for containing a head of the applicator, and said inner wall extends partway towards said lid to define a region for passage of said applicator handle from said head-containing space to said paste containing space and between said paste-containing space and said lid.

4,715,497

SHOULDER BOX FOR CIGARETTES OR THE LIKE

Heinz Focke, and Kurt Liedtke, both of Verden, Fed. Rep. of Germany, assignors to Focke & Co., Verden, Fed. Rep. of Germany

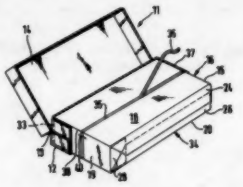
Filed Jul. 31, 1984, Ser. No. 637,237

Claims priority, application Fed. Rep. of Germany, Aug. 16, 1983, 3329456

Int. Cl.[4] B65D *85/10*; **A24F** *15/00*

U.S. Cl. 206—254 **13 Claims**

1. A shoulder box with a box portion (12) and a hinged lid (14) connected pivotably to said box part along an axis of articulation (13), said box portion for receiving a group of cigarettes (10) wrapped in an inner tin foil wrapping (15), said group of cigarettes to be aligned to lie flat in the box part parallel to the axis of articulation; said inner tin foil wrapping comprising a closed upper wall (18) with one of a tear-open thread (35) and tear-open strip (36), and tearing lines located transverse to said thread (35) or strip (36) in the upper wall (18)



such that after the thread (35) or strip (36) has been removed the upper wall can be formed into two opening tabs (43, 44) by tearing said upper wall along said tearing lines.

4,715,498

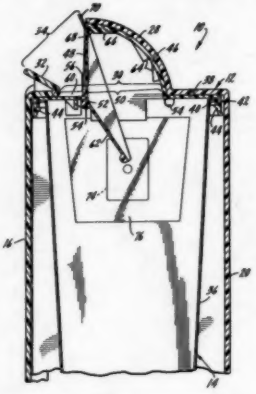
SHARPS DISPOSAL SYSTEM

Paul H. Hanifl, Barrington, Ill., assignor to Sage Products, Inc., Cary, Ill.

Filed Nov. 24, 1986, Ser. No. 934,413

Int. Cl.[4] B65F *1/16*

U.S. Cl. 206—366 **21 Claims**



1. A disposal system comprising

a. a hollow, outer enclosure,

b. an elongated slot for permitting access to the interior of the outer enclosure,

c. barrier means disposed adjacent said slot for restricting access to the interior of said outer enclosure, at least a portion of said barrier means comprising a constriction extending over said slot, and

d. a removable inner container disposed within said outer enclosure, said inner container including an inlet in registration with an no larger in dimension than said slot, said inlet extending into said slot.

4,715,499

AUTOMOTIVE ROLL-UP TOOL KIT

Randall M. Franklin, Collinsville, Ill., assignor to RVF Corporation, Collinsville, Ill.

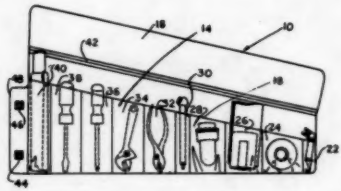
Filed Oct. 6, 1986, Ser. No. 915,628

Int. Cl.[4] B65D *30/22*

U.S. Cl. 206—373 **8 Claims**

1. A roll-up automotive repair tool kit comprising a back sheet of flexible plastic, a plurality of vertically extending open top tool pockets receiving commonly used automotive repair tools formed by a flexible plastic pocket sheet member attached to said back sheet and extending sequentially from one

end of said cover sheet to an opposite end, a top roll over flap extending laterally from one end of said back sheet to an opposite end and forming a top extension of said back sheet and means for securing the tool kit in a rolled-up position comprising a Velcro-like pad means on the inside of said back sheet adjacent an end thereof and registering Velco-like pad means on a back surface of the back sheet adapted to mate with said



first-mentioned Velcro-like pad means in the tool kit rolled-up position, said tool pockets increasing in height from one end of the kit to an opposite end and said flap being connected to said back sheet by a hinge means correspondingly increasing in height to said pockets to closely cover the open top of the tool pockets when closed and said flap being of substantially uniform height.

4,715,500
LIGHT-SENSITIVE PHOTOGRAPHIC FILM PACKAGING

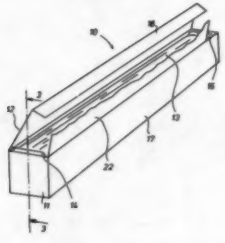
Raymond A. Heylen, Grobbendonk, and Marc J. Boets, Edegem, both of Belgium, assignors to Agfa-Gevaert N.V., Mortsel, Belgium

Filed Jul. 1, 1986, Ser. No. 881,003

Claims priority, application European Pat. Off., Jul. 12, 1985, EP 85201167.5

Int. Cl.[4] B65D *27/10, 85/67*

U.S. Cl. 206—397 **5 Claims**



1. Photographic film package for storing and dispensing undeveloped sheets of photographic sheets, comprising an elongated generally rectangular carton, a core that is rotatably journalled at its ends in said carton, and an openable light-tight cover on said box that gives in the opened position access to the interior of the box, en elongated retaining web wound in a multiplicity of windings on said core, and a plurality of separate sheets of photographic material that are sandwiched in closely spaced succession between the adjacent windings of said retaining web that is wound onto the core, whereby by opening said carton cover the free end of said sheet retaining web can be accessed and the web unwound to release said sheets one at a time.

4,715,501
IC TEST EQUIPMENT

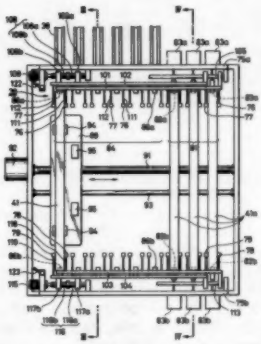
Hiroshi Sato, and Yoshihito Kobayashi, both of Tokyo, Japan, assignors to Takeda Riken Co., Ltd., Tokyo, Japan

Filed Jun. 27, 1985, Ser. No. 749,274

Claims priority, applicat' n Japan, Jun. 29, 1984, 59-98843[U]; Jun. 29, 1984, 59-98847[U]; Jun. 29, 1984, 59-98848[U]

Int. Cl.[4] B07C *5/342;* **B65G** *57/30, 59/06*

U.S. Cl. 209—573 **8 Claims**



1. IC element test equipment comprising:

an IC element loading station for loading IC elements to be tested;

a testing station for testing the IC elements supplied from the IC element loading station;

a sorting station, supplied with the IC elements tested in the testing station, for sorting the IC elements according to their test results; and

an accumulating station for receiving the IC elements sorted in the sorting station;

wherein the accumulating station comprises:

an IC element receiving magazine stocker room for receiving therein a plurality of stacks of elongated magazines, said IC receiving magazine stocker room including a first plurality of guide and positioning means for receiving the plural stacks of magazines in parallel with one another so that the lowermost ones of the stacked magazines are positioned on respective extensions of passages of supply of the sorted IC elements from said sorting station;

an empty magazine stocker room disposed on one side of said IC element receiving magazine stocker room, for receiving therein a plurality of stacks of empty magazines, said empty magazine stocker room including a second plurality of guide and positioning means for receiving respective stacks of magazines in parallel to one another and to the stacks of magazines in said first plurality of guide and positioning means;

a carrying table disposed below said empty magazine stocker room and said IC element receiving magazine stocker room and reciprocating between thereunder in a lateral direction with respect to the stacked magazines; and

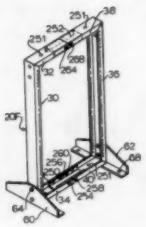
takeout and loading means mounted on said carrying table, for taking out a selected one of the lowermost empty magazines from said empty magazine stocker room onto said carrying table and loading it on a selected one of the extensions of passages from underside thereof in the IC element receiving magazine stocker room.

4,715,502

TELEPHONE EQUIPMENT RACK

Garland R. Salmon, Durham, N.C., assignor to Newton Instrument Company, Butner, N.C.

Filed Feb. 20, 1986, Ser. No. 831,165
Int. Cl.[4] A47F 5/00
U.S. Cl. 211—26 **2 Claims**



1. A rectangular, adjustable size telephone equipment rack comprising, in combination:

(a) a first U-shaped frame member formed of an integral strip of metal channel comprising a web and sides of U-shaped cross section and having a first vertical channel-formed side portion joined to horizontally-opposed channel-formed first top and first bottom portions oriented perpendicular to said first side poriton and with the respective sides of the channel forming said side, top and bottom portions being inwardly directed;

(b) a second U-shaped frame member of shape and size mating that of said first frame member and formed of an integral strip of metal channel comprising a web and sides of U-shaped cross section and having a second vertical channel-formed side portion joined to horizontal opposed channel-formed second top and second bottom portions oriented perpendicular to said second side portion and with the respective sides of the channel forming said side, top and bottom portions being inwardly directed;

(c) first connector means adjustably securing said first and second top channel portions together; and

(d) second connector means adjustably securing said first and second bottom channel portions together, said first and second connector means each being formed of a U-shaped metal channel section with a web and sides nested within the web and sides of each of a pair of selected joined channel portions and adjustably bolt secured to both said joined channel portions and providing at least two positions in which said first and second top and bottom portions may be joined to provide frame width of corresponding different span.

4,715,503

INTERLOCKING JOINT WINE RACK

David W. Johnson, 1884 Sunset Blvd., San Diego, Calif. 92103

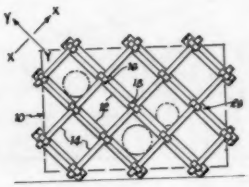
Filed Apr. 7, 1986, Ser. No. 848,573
Int. Cl.[4] A47B 73/00
U.S. Cl. 211—74 **11 Claims**

1. A wine rack comprising:

(a) a reticulated lattice defining orthogonal X, Y, and Z directions;

(b) said lattice being comprised of a plurality of elongated structrual members formed into an X-directional parallel array, a Y-directional parallel array, and a Z-directional parallel array;

(c) said parallel arrays intersecting one another to define a plurality of six-member joints between said elongated structural members and each of said joints including two of said members from each of said X-, Y-, and Z-directional arrays to form said six-member joint, said six-member joint having three elongated structural members that are only full notched, said full notch being substantially equal to two times the cross-sectional area of each of the three elongated members, two of said members having similar full notches and also having an additional half notch, said half notch being formed at ninety degrees to the full notch and substantially at mid-span of the full notch, the sixth elongated structural member having no notches at said joint and is the key post that holds the remaining five members together as a joint; and,



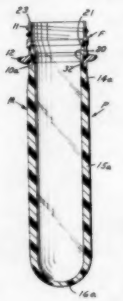
(d) each of said joints comprising an interlocking joint held together by the interlocking configurations of the elongated structural members themselves such that said lattice is rigid and completely integral without the use of blocks or sockets at the joints, or the use of fasteners or glue at any of the joints.

4,715,504

ORIENTED PLASTIC CONTAINER

Long F. Chang, Sylvania, and Scott W. Steele, Toledo, both of Ohio, assignors to Owen-Illinois Plastic Products Inc., Toledo, Ohio

Continuation of Ser. No. 783,061, Oct. 2, 1985, which is a continuation of Ser. No. 595,118, Mar. 30, 1985. This application Sep. 25, 1986, Ser. No. 912,188
Int. Cl.[4] B65D 23/00
U.S. Cl. 215—1 C **13 Claims**



1. A preform for making oriented plastic containers having a dimensionally stable finish comprising:

an injection molded finish part having an open upper end and an open lower end and made of a first plastic material,

said finish part including an axially extending inner surface and an axially extending outer surface, said outer surface including a thread portion extending axially and defining an exterior thread on the neck of the final container,

an elongated main hollow body of orientable strain-hardenable thermoplastic material injection molded and bonded in situ on said previously molded open ended finish part,

the material of said finish part having substantially greater thermal stability than the material of said hollow body,

said hollow body including a main body container forming portion and a closed bottom container forming portion closing the open end of the main body forming portion,

said hollow body having an axially extending body portion of said body engaging the open lower end of the finish part and extending within the inner surface of said finish part, the body portion having a free end terminating within and in axially spaced relationship to the open upper end of the finish part such that the inner surface of said finish part is exposed to the atmosphere and said exterior thread portion is exposed to the atmosphere, and

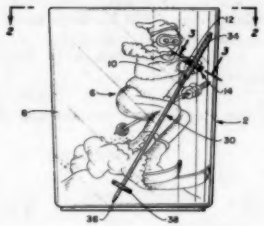
such that when the preform is blown at orientation temperatures, the hollow body forms the hollow body of a container with said inner surface of said finish part adjacent said open end of the finish part being exposed to the atmosphere and the outer surface of said open upper end of said finish part and the outer surface of said threaded portion of said finish part being exposed to the atmosphere in order that said exposed surfaces of greater thermal stability are subjected to the hot containers during filling of the container or when the contents are to be pasteurized.

4,715,505

GLASS HAVING MEANS FOR SWIZZLE STICK ATTACHMENT

Robert A. DeMars, 7932 Maestro Ave., Canoga Park, Calif. 91304

Filed May 13, 1986, Ser. No. 862,616
Int. Cl.[4] A47G *19/22, 21/00*; B65D *23/12*
U.S. Cl. 215—100 R **7 Claims**



1. A novelty glass, container, cup or the like comprising the combination:

a container capable of being held by the human hand and having on the exterior sidewall thereof a protruding bracket member adapted to receive in releasable fashion a swizzle stick or the like, wherein said swizzle stick or the like simulates a sport or the like member and wherein a sport figure representation or indicia cooperates with said bracket member so as to simulate said sport figure representation or indicia actively utilizing said sport or the like member making up said swizzle stick.

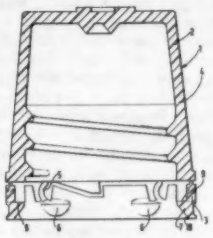
4,715,506

TAMPER RESISTANT CLOSURES

Kevin W. McLaren, Erith, England, assignor to Johnsen & Jorgensen Plastics Limited, London, England

Filed Sep. 4, 1986, Ser. No. 903,556
Claims priority, application United Kingdom, Oct. 15, 1985, 8525351
Int. Cl.[4] B65D *41/34*
U.S. Cl. 215—252 **9 Claims**

1. A container closure and container body assembly in which the container body has a mouth and an external annular or substantially annular projecting bead around the outside of the body below the mouth and in which the closure comprises a cap part with a depending skirt and a safety band connected to the skirt by frangible means characterised in that the safety band is provided with at least four relatively short spaced apart rounded lugs projecting inwardly from the band and with a plurality of relatively long spaced apart lugs of sharp profile, also projecting inwardly from the band and arranged so as to comprise at least one diametrically opposed pair, the arrangement being such that the inwardly projecting lugs cooperate with the projecting bead on the container body to prevent



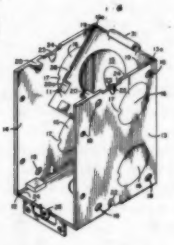
initial removal of the cap part from the container body until the frangible means connecting the skirt of the cap part to the safety band has been broken.

4,715,507

ELECTRICAL JUNCTION BOX WITH MANIPULATABLE ENDS

James C. Chamberlin, S. 3912 Bernard, Spokane, Wash. 99203

Filed May 5, 1987, Ser. No. 46,108
Int. Cl.[4] H02G *3/08*
U.S. Cl. 220—3.94 **7 Claims**



1. An electrical junction box, formed with vertical side walls joined to a common rear wall and horizontal end walls pivotal thereto, wherein said electrical box comprises:

said side walls integrally joined to said rear wall forming a "U" shaped body,

said end walls each formed with a pivotal connection to said rear wall to enable pivoting of said end wall inwardly relative to said side and rear walls, and

fastening means carried by said side walls for releasably securing the end walls in a first position forming a box and permitting the pivotal motion of the end walls relative to the side walls to a second position with said "U" shaped body when said fastening means release said end walls.

4,715,508

COLLAPSIBLE CONTAINER

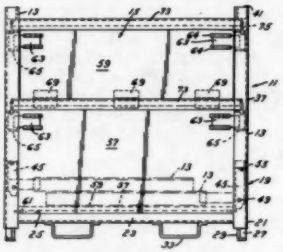
Richard C. Schurch, Livonia, Mich., assignor to BMC Manufacturing Inc., Plymouth, Mich.

Filed Aug. 11, 1986, Ser. No. 895,260
Int. Cl.[4] B65D *7/24*
U.S. Cl. 220—7 **13 Claims**

1. An improvement in a rigid collapsible container having a generally rectangularly-shaped base, the base including a plurality of lower corner posts, each lower corner post disposed at each corner of the base and each lower corner post disposed at each corner of the base and each lower corner post having a rivet securely fastened to and extending transversely from said each lower corner post, and the base including a plurality of

horizontally-oriented cross members, each cross member rigidly joining a respective two lower corner posts on each side of the base, the container further having a deck secured upon the base, and the container having a pair of end assemblies, each end assembly including a pair of upper corner posts, each upper corner post associated with a respective lower corner post, each end assembly further including a pair of corner post connectors, each corner post connector having an upper portion rigidly connected to a respective upper corner post and a lower end depending from said respective upper corner post, said lower end pivotally affixed to a respective rivet so that each end assembly is swingable between an upstanding position and a position overlying the deck, said position overlying the deck being inwardly of the lower corner posts, the improvement comprising in combination:

each corner post connector having a lock pin extending transversely from the upper portion thereof and each lower corner post having an upper end including a detent notch into which the lock pin is receivable into a detent



position, the detent notch having an edge cam surface inclined upwardly from the detent position and inwardly of the lower corner posts; and

each corner post connector including a slot through which a respective rivet extends, the slot disposed in a lower portion of said each corner post connector and having an axis of elongation parallel to an axis along which each corner post connector extends,

whereby, when an end assembly is swung from the upstanding position to the position overlying the deck, the lock pin is cammed out of the detent position as the lock pin is lifted by the edge cam surface, thus allowing collapsing of the end assembly without the necessity of manually disengaging the lock pin from the detent notch and without the necessity of manually lifting the end assembly, and, when an end assembly is swung from the position overlying the deck to the upstanding position, the lock pin reaches a position at which the lock pin is cammed into the detent position.

4,715,509

FUEL FILLER CONDUIT

Takaaki Ito; Eiji Mori; Koji Uranishi; Shinji Miyazaki, and Junichi Sugimoto, all of Toyota, Japan, assignors to Toyota Jidosha Kabushiki Kaisha and Horie Metal Co., Ltd., both of Aichi, Japan

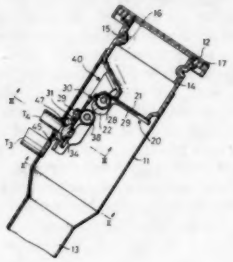
Filed Jul. 10, 1986, Ser. No. 884,154

Claims priority, application Japan, Jul. 31, 1985, 60-169613; Jul. 31, 1985, 60-169614; Jul. 31, 1985, 60-169615

Int. Cl.[4] B65B *31/06*

U.S. Cl. 220—86 R **4 Claims**

1. A fuel filler conduit connected with a fuel reservoir for the inner combustion engine at one end thereof and having the other open end normally closed by a cap, comprising a through hole formed in the circumferential wall of the conduit for outletting fuel vapour; first valve means normally urged by spring means to be in a position for closing a port leading to said other open end; and a second valve means normally urged by other spring means to be in a position for closing said fuel vapour outlet and so engaged with said first valve means that when a fuel supply nozzle is inserted in the conduit from said other open end said first valve means is opened by the tip of



said nozzle against the force of said spring means, whereby said second spring means is opened against the force of said other spring means for allowing fuel vapour to pass through said outlet to be supplied to said engine for combustion.

4,715,510

SET UP PIECE FOR MOUNTING ON A CAN, CONTAINING A BEVERAGE

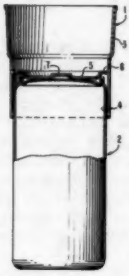
Leendert van der Meulen, 1804 Bayshore Road, SW., Calgary, Alberta, Canada T2V 3M1, and Adriaan Van Der Wouden, Ulvenhout, Netherlands, assignors to Leendert van der Meulen, Calgary, Canada

Filed Feb. 28, 1986, Ser. No. 834,771

Claims priority, application Netherlands, Mar. 1, 1985, 8500574

Int. Cl.[4] B65D *25/48*

U.S. Cl. 220—90.4 **10 Claims**



1. A beverage can drinking attachment comprising:

(a) a substantially cylindrical body having clamping means for obtaining a liquid tight connection between the beverage can attachment and a can top positioned at a lower end of said body;

(b) a disk extending substantially transverse across said body dividing said body into a drinking portion and clamping portion, said disk having means for engaging an upper rim of the can top;

(c) an aperture in said disk which when the can attachment is placed on the can top said aperture is alignable with a can lid opening;

(d) said clamping means comprising a straight, cylindrical skirt extending from a joint between said cylindrical body and said disk, said skirt having at a lower edge an inwardly extending rib which engages a cylindrical wall of the can substantially below an upper rim of the can, said skirt extending a substantial distance below the rim of the can

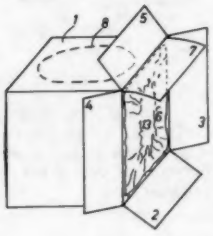
when the can attachment is placed on the can top whereby the can attachment provides a substantially liquid tight engagement, regardless of the shape or diameter of the upper part of the can or upper rim of the can.

4,715,511

PACK COMPRISING AN OUTER RIGID ENVELOPE AND AN INNER FLEXIBLE ENVELOPE

Dietrich Böhlen, Puidoux, Switzerland, assignor to Nestec S.A., Vevey, Switzerland

Filed Sep. 18, 1986, Ser. No. 909,143
Claims priority, application Switzerland, Oct. 3, 1985, 4279/85
Int. Cl.[4] B65D *5/54*
U.S. Cl. 220—403 14 Claims



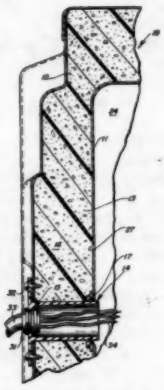
1. A pack comprising
(a) a rigid outer envelope having at least one face and at least one flap associated with the face;
(b) a flexible inner envelope located within the outer envelope; and
(c) immobilization means between the inner and outer envelope and affixed to the inner envelope,
the immobilization means abutting a face of the outer envelope and extending to each flap associated with the face, and having an opening positioned opposite and corresponding with an opening defined on the face.

4,715,512

INSULATED CABINET MANUFACTURE

William J. Buchser, Marrs Township, Posey County, Ind., assignor to Whirlpool Corporation, Benton Harbor, Mich.

Filed Sep. 3, 1981, Ser. No. 299,037
Int. Cl.[4] F25D *23/08*
U.S. Cl. 220—465 9 Claims



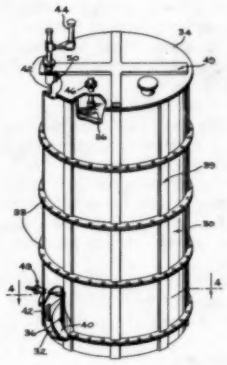
1. In a cabinet structure having an outer shell, and an inner liner spaced inwardly from the shell to define the insulation space therebetween the improvement comprising:
a wiring tunnel member extending successively through said outer shell, said insulation space, and said liner;
a first foam stop member adjacent said liner in said insulation space, said wiring tunnel member extending through said first foam stop member;
a second foam stop member extending about and bodily movable longitudinally along said wiring tunnel member in said insulation space; and
foamed-in-place insulation in said insulation space urging said second foam stop member into engagement with said first foam stop member to cause said foam stop members to cooperatively stop the insulation foam at the extension of said wiring tunnel element through said liner.

4,715,513

TOXIC MATERIAL STORAGE VESSEL CONTAINMENT SYSTEM

Amos H. Shelton, Jr., P.O. Box 327, Calvert City, Ky. 42029

Filed Dec. 9, 1985, Ser. No. 806,431
Int. Cl.[4] B65D *6/38, 25/18*
U.S. Cl. 220—469 3 Claims



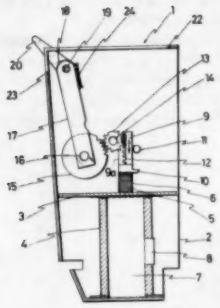
1. A toxic material storage vessel containment system comprising
a cylindrically shaped hollow jacket having a flat circular bottom surface, a removable circular lid forming an upper surface for said jacket enclosing a conventional toxic material storage vessel therein,
a plurality of vertically extending ribs formed in and spaced around said jacket and defining channels therein which communicate with the interior of said jacket,
a raised disc shaped base eccentrically located relative to the vertical axis of said jacket and mounted on said bottom surface so as to be tangent to a single vertical line along the inside curved surface of said jacket, whereby a crescent shaped depression is formed between an arcuate portion of said jacket and a corresponding arcuate portion of said base for accumulating a liquid leaking from said vessel, and
leak detecting means mounted on said jacket and extending into said depression for detecting the presence of liquid which has leaked from said vessel.

4,715,514

AUTOMATIC UNITARY PRODUCT DISPENSING DEVICE

Felix G. Vidondo, Peralta, Spain, assignor to Jofemar, S.A., Peralta, Spain

Filed Apr. 11, 1986, Ser. No. 851,141
Claims priority, application Spain, Apr. 15, 1985, 286032
Int. Cl.[4] B65H *3/24*; B65G *59/06*; G07F *11/16*
U.S. Cl. 221—258 **1 Claim**



1. An automatic unitary-product dispensing device, comprising:

a frame having two grooves therethrough;

a coil having a movable core, the coil being joined to the frame;

one U-shaped flange joined at one end to one end of the core of the coil for movement therewith;

a stud fixed relative to the frame and cooperative with the one U-shaped flange for guiding the movement thereof with the core;

a projection at the one end of the one U-shaped flange joined to the one end of the core but butting against the stud, whereby to prevent further movement of the one U-shaped flange with the core;

a rack in the one U-shaped flange for movement therewith;

a pinion meshed with the rack for rotation upon the movement of the rack with the one U-shaped flange;

a toothed wheel meshed with the pinion for rotation thereby;

another U-shaped flange secured to the toothed wheel at one end for rotation therewith and extending into two lugs at the opposite end;

rotatable means positioned between the lugs for rotation therebetween;

two fingers connected to the rotatable means for rotation therewith and movement respectively along the grooves upon the rotation of the another U-shaped flange, whereby said fingers engage a product to dispense the product.

4,715,515

HOPPER AND METERING MECHANISM STRUCTURE FOR AN AGRICULTURAL IMPLEMENT

Ronald M. Stellen, Ankeny, Iowa, assignor to Deere & Company, Moline, Ill.

Filed Jul. 10, 1986, Ser. No. 884,148
Int. Cl.[4] B67D *5/60*
U.S. Cl. 222—143 **14 Claims**

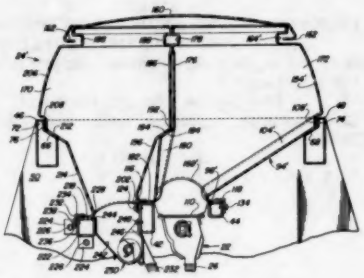
1. Hopper structure for a seeding and/or fertilizing implement having a frame, said hopper structure comprising:

first and second support surfaces extending parallel and spaced with respect to each other to define an elongated opening therebetween;

meter support structure having outwardly directed support flanges for support on the respective support surfaces;

a flexible tank having lower sidewalls terminating in lower, outwardly extending tank flanges; and

means releasably sandwiching the outwardly directed support flanges between the outwardly extending tank flanges and the support surfaces, said means releasably



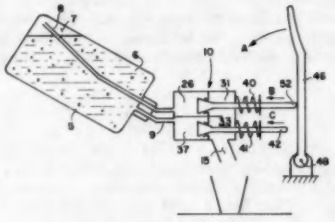
sandwiching including an elongated flat portion and means securing the flat portion against the generally parallel to one of the tank flanges independently of fasteners passing through said one of the flanges and the corresponding support flange.

4,715,516

APPARATUS FOR DISPENSING CARBONATED BEVERAGE FROM CONTAINERS

Napoleon P. Salvail, 6610 South Fork, Titusville, Fla. 32780

Filed Mar. 7, 1986, Ser. No. 837,211
Int. Cl.[4] B67D *3/00*
U.S. Cl. 222—153 **7 Claims**



1. A beverage dispensing assembly including a container with a threaded neck and means for dispensing a liquid from said container comprising:

(a) a stand having supporting means for supporting said container such that said liquid can flow by gravity from said neck;

(b) a dispensing valve sealingly attached to said neck and having

(i) a body portion;

(ii) a vent tube projecting from said body portion into the ullage volume of said container,

(iii) a spout,

(iv) a vent valve disposed in a passage in said body portion and having biasing means for biasing said vent valve in a normally closed position, said vent valve having an outlet communicating with said spout and an inlet,

(v) said vent tube disposed in said inlet and extending through said container into and communicating with the ullage volume of said container,

(vi) a fluid valve disposed in a passage communicating with the interior of said container and said spout, and having biasing means for biasing said fluid valve in a closed position, and

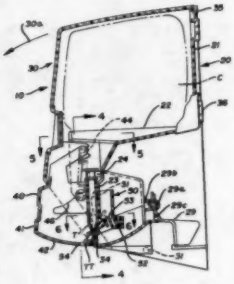
(vii) a lever attached to said body and operatively coupled to said vent valve and to said fluid valve such that movement of said lever sequentially opens first said vent valve and then said fluid valve thereby venting said ullage volume via said spout and dispensing said liquid via said spout.

4,715,517

DISPENSER HAVING A ROLLER FOR SQUEEZING MATERIAL FROM A TUBE

Charles Potter, Stow; Ronald F. Bell, Uniontown, and John M. Tosill, Barberton, all of Ohio, assignors to Go-Jo Industries, Inc., Cuyahoga Falls, Ohio

Filed Jun. 26, 1986, Ser. No. 878,643
Int. Cl.[4] B65D *35/28*
U.S. Cl. 222—181 **8 Claims**



1. A fluid dispenser for use with a source of fluid having a flexible valveless dispensing tube having an open end, comprising:

(A) a base unit for reception of the source of fluid;

(B) external closure means for normally engaging and closing off the open end of the tube;

(C) said closure means including cam means pivotally carried by said base unit;

(D) a roller assembly engagable with said cam means and being movable into and out of collapsing and dispensing engagement with the tube;

(E) means for moving said roller assembly along said cam means and along the tube toward the open end thereof;

(F) said roller assembly cooperating with said cam means for release of said closure means during at least a portion of the time said roller assembly moves along the tube; and

(G) said roller assembly disengaging said cam means and permitting return of said closure means to its normal position prior to disengagement with the tube.

4,715,518

DISPENSER FOR STRIPED VISCOUS PRODUCTS

David G. Moore, Lee's Summit, Mo., assignor to Realex Corporation, Lee's Summit, Mo.

Continuation of Ser. No. 631,258, Jul. 16, 1984, abandoned. This application Oct. 3, 1986, Ser. No. 926,853
Int. Cl.[4] G01F *11/00*
U.S. Cl. 222—257 **5 Claims**

1. In a manually operated dispensing pump, the improvement comprising:

a hollow cylindrical body defining an internal product chamber;

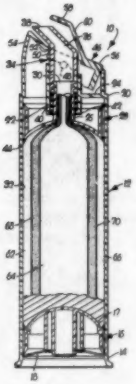
a pumping piston at one end of the body supported for reciprocal movement through repeated strokes of limited length toward and away from the opposite end of the body,

said piston having yieldable means associated therewith for returning the piston to its original position following each dispensing stroke and having a centrally disposed, axially extending discharge passage in continuously open communication with said product chamber;

a discharge spout having an internal outlet passage of reduced diameter compared to the product chamber in continuously open communication with said discharge passage of the piston;

a take-up piston at the opposite end of the body from the pumping piston movable toward the pumping piston under the force of atmospheric pressure outside of the body and subatmospheric pressure inside of the body following each dispensing stroke of the pumping piston whereby to reduce the volume of the product chamber by an amount which corresponds to the volume of product dispensed during the immediately preceding dispensing stroke,

said take-up piston having means associated therewith for preventing retrograde movement of the take-up piston in a direction away from the pumping piston during the dispensing stroke of the pumping piston;



a viscous product mass within said product chamber containing a plurality of circumferentially spaced apart, axially extending product stripes of different colors,

said pumping piston having a smooth, concave, product-engaging face surrounding the discharge passage thereof and extending radially outwardly across the width of the product chamber for gently funneling the striped product mass laterally inwardly into and axially through said passages during movement of the pumping piston through its dispensing stroke, whereby to produce an axially striped, multi-colored bead of product emanating from the spout whose stripes are proportionately closer together and narrower than the stripes of the mass in the product chamber,

said passages of the pumping piston and the spout being devoid of internal obstructions to product flow throughout their full lengths whereby to preserve and maintain the integrity of the multi-colored stripes in the product passing through said passages; and

actuating means operably coupled with said pumping piston for operating the same.

4,715,519

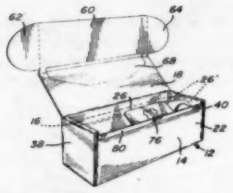
ROLLED DISPENSER FOR CUTTING A CONTINUOUS ROLLED SHEET AND A BLANK THEREFOR

David Fischer, Downsview, Canada, assignor to Domtar Inc., W. Montreal, Canada

Filed Apr. 28, 1986, Ser. No. 856,833
Int. Cl.[4] B26F *3/02*
U.S. Cl. 225—48 **9 Claims**

1. A roll dispenser for cutting a continuous rolled sheet of material comprising: a box having a bottom, a pair of opposite

longitudinal sides extending from said bottom, a pair of opposite ends extending from at least one of said longitudinal sides and said bottom, said ends being perpendicularly oriented with respect to said longitudinal sides, and defining said box for receiving a roll of continuous sheet material, a first of said longitudinal sides having a longitudinal free edge away from said bottom being provided with a cutting element, at least one tongue element inwardly and upwardly mounted on said first of said longitudinal sides and near said longitudinal free edge, a second of said longitudinal sides extends away from said bottom into a hingedly connected longitudinal panel defining a top for said box said at least one tongue element having an edge



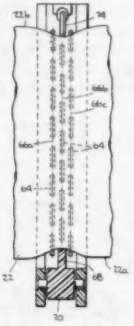
away from said first of said longitudinal sides, said edge providing support in space relation between said cutting element on said first of said longitudinal sides and a roll of continuous sheet material to be received in said box, whereby, upon insertion of said roll of sheet material in said box said edge projects into, biases against and supports said sheet material between said top and said at least one tongue element to prevent the recoil of the free end of sheet material onto said roll, and whereby upon cutting said sheet material by said cutting element, the end portion of the roll of sheet material remains on said edge of said at least one tongue element and can be rapidly withdrawn to be further cut by said cutting element.

4,715,520

SURGICAL FASTENER APPLYING APPARATUS WITH TISSUE EDGE CONTROL

William H. Roehr, Jr., Ridgefield, Conn., and Richard L. Goodman, White Plains, N.Y., assignors to United States Surgical Corporation, Norwalk, Conn.

Filed Oct. 10, 1985, Ser. No. 785,992
Int. Cl.[4] A61B *17/04*
U.S. Cl. 227—19 **13 Claims**



1. An apparatus for applying a plurality of surgical fasteners to body tissue comprising:

a fastener holder cartridge containing an array of fastener in parallel rows;

an anvil opposite said cartridge for clamping of body tissue therebetween;

a pusher for expelling said array of fasteners from said cartridge towards said anvil part for applying the fasteners to the body tissue; and

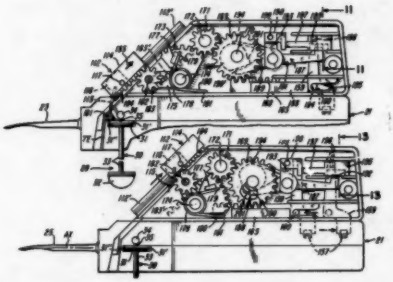
a tissue edge control member at least at one side of said anvil in longitudinal alignment with at least one row of fasteners and extending within said array of fasteners to confine the clamped body tissue within said array of fasteners.

4,715,521

HAND-HELD TAG ATTACHER

Larry D. Strausburg, Kettering, Ohio, assignor to Monarch Marking Systems, Inc., Dayton, Ohio

Division of Ser. No. 654,333, Sep. 25, 1984, Pat. No. 4,673,120.
This application Jan. 27, 1987, Ser. No. 6,858
The portion of the term of this patent subsequent to Jun. 16, 2004, has been disclaimed.
Int. Cl.[4] A43D *69/00*
U.S. Cl. 227—67 **9 Claims**



1. A hand-held tag attacher for attaching tags to merchandise using fasteners, each fasteners having a bar section and a button section joined by a filament section, the attacher being solely manually powered and comprising: an attacher body having a hopper adapted to receive a stack of tags and having a manually engageable handle, a needle mounted to the body and having an elongate needle bore and an elongate size opening communicating with the needle bore, means for advancing one bar section at a time into alignment with the needle bore, a push rod engageable with a bar section of a fastener for driving the bar section through the needle bore while its filament section extends through the side opening, a tag feeder engagable with an endmost tag in the hopper for feeding the endmost tag from its position in the stack along a path to an attaching position in alignment with the needle, means for moving the bar section advancing means, the push rod and the tag feeder through a cycle, wherein the moving means includes manually operable actuating means disposed at the handle, wherein the moving means further includes a cam and a lever driven by the cam, wherein the tag feeder includes a slide, a pin mounted for reciprocating movement on the slide, and means for coupling the lever to the slide.

4,715,522

NAIL RESERVE INDICATOR

Rodney B. Jordan, Box 39, Florien, La. 71429

Filed Dec. 5, 1986, Ser. No. 938,418
Int. Cl.[4] B25C *7/00*
U.S. Cl. 227—156 **9 Claims**

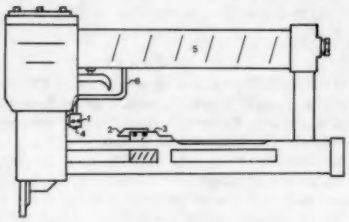
1. A pneumatic fastener driver device with an attached magazine and a device for indicating the depletion of fasteners within the magazine comprising:

(a) a pneumatic fastener driver housing;

(b) a fastener magazine attached to said housing;

(c) means attached to said housing for producing an audible signal; and

(d) trigger means attached to said magazine and connected to said signal producing means for detecting a low-fastener condition in said magazine and for triggering said signal producing means so at to produce an audible signal.

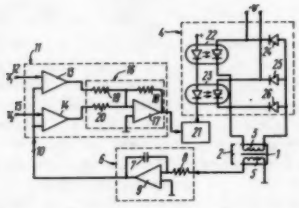


4,715,523

ELECTROMAGNETIC POWER DRIVE FOR A FRICTION WELDING MACHINE

Vladimir K. Lebedev, ulitsa Engelsa, 25, kv. 12; Ivan A. Chernenko, ulitsa Lomonosova, 24, kv. 125; Alexandr T. Dyshlenko, ulitsa Vasilkovskaya, 49, korpus 3, kv. 14; Leonid V. Litvin, ulitsa Vernadskogo, 87, kv. 46, and Vladimir I. Tishura, ulitsa Chigorina, 55, kv. 27, all of Kiev, U.S.S.R.

Filed Nov. 12, 1984, Ser. No. 930,664
Int. Cl.[4] B23K *20/12, 27/00*
U.S. Cl. 228—2 **1 Claim**



1. An electromagnetic power drive for a friction welding machine, comprising:

a first magnetic core which is stationary;

a second magnetic core adapted for axial motion and rotation in relation to said first magnetic core;

a power coil installed on said first magnetic core;

at least one pickup coil installed on said first magnetic core;

an integrator producing voltage proportional to the actual value of the magnetic flux during said friction welding, having an output and an input connected to each said pickup coil;

a comparison means having an input connected to said output of said integrator, a first driving input, a second driving input, and an output;

a first comparator having an input, an output, and a driving input which is said first driving input of said comparison means, to which voltage proportional to a first assigned value of the magnetic flux is applied;

a second comparator having an output, a driving input which is said second driving input of said comparison means, to which voltage proportional to a second assigned value of the magnetic flux is applied during said friction welding, and an input joined together with said input of said first comparator in order to form said input of said comparison means;

a control signal generator having a hysteresis output characteristic, an input connected to said outputs of said first and second comparators, and an output which is said output of said comparison means; and

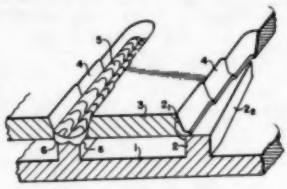
a voltage regulator made as a switch operated by control signals of said control signal generator, having a control input electrically connected to said output of said comparison means, and an output connected to said power coil.

4,715,524

ASSEMBLY OF PARTS TO BE FORMED INTO A T-JOINT WELD

Yasuhiro Fukaya, and Nagio Minami, both of Hiroshima, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 12, 1986, Ser. No. 838,618
Claims priority, application Japan, Feb. 13, 1986, 61-27970
Int. Cl.[4] B23K *9/02*
U.S. Cl. 228—165 **3 Claims**



1. An assembly of parts for being welded into a T-joint weld, comprising:

a rib-like member having opposite faces and a thickness between said faces which increases from a thin end to a thick end, said faces being at an angle to the length of said rib-like member;

a pair of plate members with spaced opposed edges;

beveled edge portions on the opposed edges of said plate member, said beveled edge portions having at least the lower edges with an elongated scalloped shape constituted by substantially straight elongated edge parts joined by curved edge parts;

said lower edges lying along the edges of the top surface of said rib-like member with said lower edges spaced from each other, and with the straight elongated edge parts at smaller angle to the length of the rib-like member than the faces of the rib-like member for forming gaps between the lower edges adjacent the curved edge parts and overlapping portions along the remainder of the edges;

whereby when the assembly is welded for welding the plate members to the rib member, even if the welding conditions are not changed precisely and continuously along the length of the rib member, the weld will have good quality along the entire length of the rib member.

4,715,525

METHOD OF BONDING COLUMBIUM TO TITANIUM AND TITANIUM BASED ALLOYS USING LOW BONDING PRESSURES AND TEMPERATURES

Brian Norris, San Diego, Calif., assignor to Rohr Industries, Inc., Chula Vista, Calif.

Filed Nov. 10, 1986, Ser. No. 928,862
Int. Cl.[4] B23K *20/00, 20/16, 20/22*
U.S. Cl. 228—194 **8 Claims**

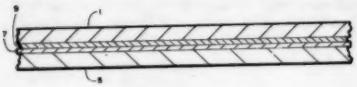
1. A method of bonding columbium to titanium and titanium based alloys, comprising the steps of:

(a) providing a first thin sheet of columbium,

(b) providing a second member having a composition taken from the class consisting of titanium and titanium based alloys,

(c) forming a layer of nickel and a layer of copper onto said second member, each of said layers having a thickess of less than about 0.0005 inches,

(d) placing said first sheet and second member in intimate contact with each other with said layers therebetween,



(e) heating the arrangement of (d) in a vacuum to a temperature below the beta-transus of the titanium material in (b) and above 1652° F., and

(f) cooling the arrangement of (e) to ambient temperature.

4,715,526

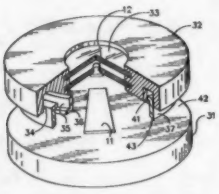
FLOATING SEAL AND METHOD OF ITS USE

Douglas E. MacNeil, West Covina, Calif., assignor to General Dynamics, Pomona Division, Pomona, Calif.

Filed Nov. 20, 1986, Ser. No. 932,848

Int. Cl.⁴ B23K *37/04*

U.S. Cl. 228—219 **20 Claims**



1. Apparatus for providing a floating seal for an inert gas reflow chamber, said apparatus comprising:

an upper chuck adapted to retain a first workpiece intended to be secured to another;

a lower chuck adapted to retain a second workpiece to which the first workpiece is intended to be secured, said upper and lower chucks being adapted to move said workpieces axially with respect to each other;

floating sealing means located between said upper and lower chucks; and

means for mounting said sealing means to said upper chuck for limited free axial movement with respect to said upper chuck, and for selectively free rotational and lateral movement with respect to said lower chuck;

whereby upon said sealing means being in sealing contact with both said upper and lower chucks, said upper and lower chucks and said sealing means form a sealed chamber, and selective rotational, lateral and axial adjustments may be made between the relative positions of said chucks while maintaining the integrity of said sealed chamber.

13. A method for reflow soldering in an inert gas chamber formed of an upper chuck, a lower chuck and a substantially non-deformable sealing member, said method comprising the steps of:

mounting said sealing member to said upper chuck for limited free axial movement with respect thereto;

separating said upper and lower chucks;

mounting a first workpiece to said upper chuck;

mounting a second workpiece to said lower chuck;

moving one of said chucks with respect to the other to a position where said lower chuck contacts a protruding surface of said sealing member and pushes said sealing member telescopically into said upper chuck for a portion of its possible axial movement, thereby forming the sealed chamber but with the first and second workpieces being still in spaced confronting relationship;

purging the sealed chamber with inert or reducing gas;

axially moving said lower chuck with respect to said upper chuck to establish a predetermined bonding pressure contact of said first workpiece with said second workpiece, thereby moving said sealing member telescopically further into said upper chuck but still within the limits of its range of motion; and

directly measuring the bonding force between said first and second workpieces by means of a force transducer.

4,715,527

ULTRASONICALLY SEALED SIDE SEAM ON CUP

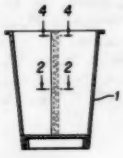
Kiyoshi Tsuzuki; Sigeto Tanaka, both of Sagamihara, and Yoshiaki Take, Fujisawa, all of Japan, assignors to Toppan Printing Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 765,171, Aug. 12, 1985, abandoned, which is a continuation of Ser. No. 534,259, Sep. 20, 1983, abandoned, which is a continuation of Ser. No. 340,357, Jan. 18, 1982, abandoned, which is a division of Ser. No. 217,217, Dec. 17, 1980, Pat. No. 4,374,697. This application Sep. 11, 1986, Ser. No. 907,123

Claims priority, application Japan, Dec. 26, 1979, 54-169600; Dec. 26, 1979, 54-169601; Dec. 26, 1979, 54-169602; Dec. 26, 1979, 54-180535

Int. Cl.⁴ B65D *3/28*

U.S. Cl. 229—1.5 B **3 Claims**



1. A container comprising a tubular frustoconical side wall member having open ends, one of which is of smaller diameter than the other and a flat circular bottom member disposed at the open end of smaller diameter; said side wall member comprising a trapezoidal blank laminate of two coextensive plies, one ply comprising cardboard and the other ply comprising plastic, said trapezoidal blank having spaced, parallel top and bottom edges and symmetrically converging side edges and said blank being formed to assume said tubular frustoconical configuration with the cardboard ply at the outside and the plastic ply at the inside and with the side edges overlapping such that the plastic ply at the inner marginal edge of the outer one of the side edges is disposed in contact with the paperboard ply at the outer marginal edge of the inner one of the side edges, said side wall member having at its upper end a radially-disposed lip and at its lower end an inwardly-disposed upturned flange defining a groove peripherally of the lower end, the inner surface of which is constituted by the plastic ply and said bottom member corresponding in diameter to the open end of smaller diameter and being provided with a downturned peripheral flange turned downwardly from the plastic side such as to have contact with the inner plastic side of the side wall member at the lower end and wherein the cardboard ply at the marginal edge of the inner one of the side edges is skived and the plastic ply at said marginal edge folded to dispose the plastic ply about the end edge into contact with the plastic ply at the inner side of the outer one of the side edges and wherein the lapped ends are ultrasonically bonded using an ultrasonic horn throughout an area coextensive with the confronting overlapping surfaces thereof from the rim at the top downwardly along the overlapping surfaces at least several millimeters to reinforce the top and wherein the confronting overlapping surfaces of the lapped ends along the remainder of the distance toward the bottom are adhered to each other throughout an area corresponding in length to the remainder of the distance toward the bottom and in width from the edge of the outer one of the lapping ends toward the edge of the inner one of the lapping ends a distance less than the width of

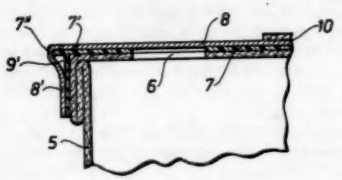
the overlapping surface such that the remainder of the confronting surfaces are unattached.

4,715,528

RECLOSABLE OPENING ARRANGEMENT ON A PACKING CONTAINER

Tom Kjelgaard, Löddeköpinge; Anders Hallberg, Lund, and Kenth Jacobsson, Södra Sandby, all of Sweden, assignors to Tetra Pak International AB, Lund, Sweden

Filed Sep. 9, 1986, Ser. No. 905,157
Claims priority, application Sweden, Sep. 20, 1985, 8504351
Int. Cl.[4] B65D *5/72*
U.S. Cl. 229—123.1 **13 Claims**



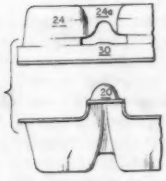
1. In an opening arrangement on a packing container having a pouring opening formed in a container wall, the arrangement including a cover strip having an underside and being an openable closure of the pouring opening and a pouring edge strip arranged between the cover strip and the container wall, the improvement comprising the cover strip being provided with a gripping element in the form of a strip applied to the underside of the cover strip to provide detachable gripping of the pouring edge strip, said gripping element including means for reclosing said opening arrangement.

4,715,529

BEAK-TYPE CARTON LOCK

Kenneth D. Bixler, Huntington, N.Y., assignor to Packaging Corporation of America, Evanston, Ill.

Continuation of Ser. No. 530,840, Sep. 9, 1983, abandoned. This application Jul. 17, 1986, Ser. No. 870,148
Int. Cl.[4] B65D *1/34*
U.S. Cl. 229—2.5 R **9 Claims**



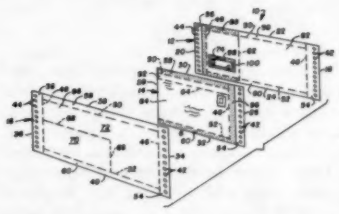
1. In a molded container having a tray section and a cover section hingedly connected to a rear side of said tray section for movement between an open position and a closed position, said try section having at least one fixedly positioned upstanding male latching member formed on a front side thereof, said cover section having a female latching formation formed in a front wall thereof, said container being further characterized in that the female latching formation includes a recessed upper marginal portion having a configuration which in part takes the shape of an inverted U having a closed end portion at a height at least as great as the height of said upstanding male latching member, and a width less than the width of said male latching member defining at least one flexible ear along said upper marginal portion which, in the locking position, lies behind at least a portion of said upstanding male latching member.

4,715,530

TWO-PART MAILER WITH RETURN ENVELOPE

David J. Leese, Indianapolis, Ind., and Robert E. Ashby, Quakertown, Pa., assignors to Moore Business Forms, Inc., Glenview, Ill.

Continuation-in-part of Ser. No. 834,765, Feb. 28, 1986, abandoned. This application Mar. 13, 1987, Ser. No. 25,724
Int. Cl.[4] B65D *27/06*
U.S. Cl. 229—73 **44 Claims**

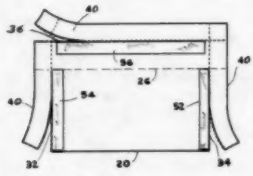


1. A two-part mailer with a return envelope, comprising:
a first part, including:
a top sheet having a front face and a rear face;
an intermediate sheet having a front face and a rear face;
securement means joining said front face of said intermediate sheet to said rear face of said top sheet along a generally C-shaped band so that a first portion of the top sheet is disposed in facewise juxtaposition with a first portion of the intermediate sheet, with the C-shaped band of securement means defining on these sheets the internal perimeter of a return envelope, with potentially open mouth of such return envelope being defined between opposite limbs of said C-shaped band of securement means;
a second portion of said top sheet adjoining said first portion thereof outside said C-shaped band of securement and extending beyond a perimetrical edge of said intermediate sheet;
means defining a window aperture through said second portion of said top sheet beyond said perimetrical edge of said intermediate sheet;
two complementary C-shaped bands of deactivated, activatable adhesive disposed on said rear faces of said top and intermediate sheets, these two bands being arranged to form a hollow generally rectangular figure which collectively jointly perimetrically rings said return envelope and said window aperture;
at least one field of constant information printed on at least one of said top sheet and intermediate sheet; and
a second part, including:
a bottom sheet having a front face and a rear face;
this bottom sheet being of sufficient size and shape as to permit facewise juxtaposition of said two complementary C-shaped bands of adhesive with said front face thereof substantially completely about the perimetrical extent of said generally rectangular figure;
this bottom sheet being adapted to be printed with information including at least one field of variable information located so as to be visible through said window aperture upon such juxtaposition of said two complementary C-shaped bands of adhesive with said front face of said bottom sheet.

4,715,531
REUSABLE REMAILABLE ENVELOPE

Russell M. Stewart, 1350 Ala Moana Blvd., Suite 1350, Honolulu, Hi. 96814, and Rodney A. Gomes, 1760 Hookupa St., Pearl City, Hi. 96782

Filed Sep. 10, 1985, Ser. No. 774,437
Int. Cl.[4] B65D *27/06*
U.S. Cl. 229—73 **10 Claims**

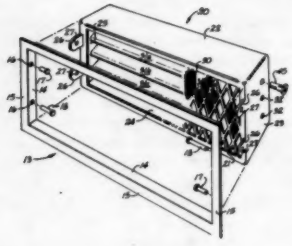


1. A reusable mailing envelope having a single sheet of paper with first and second surfaces and having a central fold thereby forming face and back portions, with the second surface on the face and back portions being juxtaposed and the first surface of the face and back portions being remote from one another, and the sheet having perforations spaced inward from peripheral edges thereof and extending parallel to the peripheral edges thereby forming detachable portions along the peripheral edges, first adhesive strips on the second surface in the detachable portions along lateral edges and a first activatable adhesive strip on the second surface of a detachable terminal edge portion along a terminal edge, and second activatable adhesive strips positioned inward from perforations on a back portion of the first surface, whereby the face portion of the first surface is an addressable and postage bearing area and wherein the face portion of the second surface is an addressable and postage bearing area.

4,715,532
ADJUSTABLY RESETTABLE, TEMPERATURE-RESPONSIVE AUTOMATIC VENTILATOR

Paul M. Sarazen, Jr., 214 Fairview Dr., and Dennis A. Beam, 410 Westfield Rd., both of Shelby, N.C. 28150, assignors to Paul M. Sarazen and Dennis A. Beam, both of Shelby, N.C.

Filed Jul. 16, 1986, Ser. No. 886,531
Int. Cl.[4] F24F *13/14*
U.S. Cl. 236—49 **13 Claims**

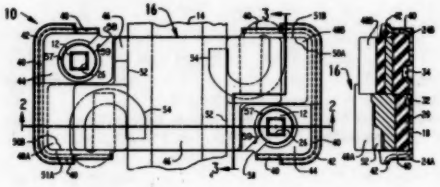


1. An automatic ventilator comprising:
(a) a housing, said housing having peripheral side walls defining an air passageway therethrough;
(b) a setting opening defined in one of said side walls;
(c) at least one shutter element received in said air passageway and mounted to said housing for rotary movement between a closed position where the passageway is generally closed and an open position where the passageway is generally open to the passage of ventilating air therethrough;
(d) temperature responsive drive means operatively associated with said shutter element for driving said shutter element between said open and closed positions;
(e) a setting plug receivable in said side wall setting opening, said plug having at one end two opposed members extending outwardly therefrom and defining a receiving slot therebetween, said receiving slot receiving one end of said drive means, said receiving slot being defined by opposing members having at least one gripping tooth engageable with said drive means, said plug having at an opposite end means for securing said plug against undesired rotation relative to said setting opening so that said plug when inserted into said setting opening non-rotatably secures said one end of said drive means relative to said side wall, and said means for securing said plug being selectively rotatable in infinitely varying increments relative to said setting opening and securable therein by deforming said setting opening for adjusting said plug relative to said setting opening; and
(f) whereby temperature variation effects on said drive means cause said shutter element to move toward an open or closed position.

4,715,533
RAIL FASTENER ASSEMBLY WITH HORIZONTAL FLANGES

James H. Bucksbee, 5187 West Rd., McKean, Pa. 16426, and Casimir K. Siwek, 3427 Aberdeen Ave., Erie, Pa. 16506

Filed Apr. 1, 1986, Ser. No. 846,790
Int. Cl.[4] E01B *9/62, 9/68*
U.S. Cl. 238—283 **10 Claims**

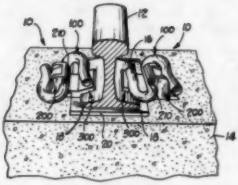


1. In a rail fastener assembly for resiliently mounting a rail upon a support structure, said assembly including a lower plate having a pair of opposite peripheral edges extending generally in the rail direction, said edges having upstanding flanges integral therewith and extending generally vertically upwardly therefrom, a rail supporting upper plate disposed in vertically spaced overlying relationship to said lower plate and having opposite peripheral edge portions in laterally spaced confronting relationship to said flanges of said lower plate, and resilient elastomeric material interconnecting said plates for resilient vertical and lateral movement of said upper plate relative to said lower plate, the improvement comprising: generally horizontally extending flanges formed integrally with and projecting outwardly from said upstanding flanges adjacent the upper ends thereof, said horizontally extending flanges increasing the ability of said upstanding flanges to withstand without failure lateral forces imposed thereon during use of the assembly and said lower plate has a second pair of opposite peripheral edges generally perpendicular to said first mentioned pair; flange means upon at least one of said opposite peripheral edges for further increasing the failure resistance of said upstanding flanges upon said edges of said first pair, and for limiting movement of upper plate in the rail direction.

4,715,534
RAIL FASTENING ASSEMBLIES

Graham M. Fee, Geneva, Ohio, assignor to Chemetron Railway Products, Inc., Chicago, Ill.

Continuation of Ser. No. 240,411, Mar. 4, 1981, abandoned, which is a continuation of Ser. No. 930,232, Aug. 2, 1978, abandoned. This application Apr. 30, 1986, Ser. No. 858,094
Int. Cl.[4] E01B *9/30*
U.S. Cl. 238—349 **19 Claims**



1. A drive-on rail fastening assembly for securing a railway rail, having laterally projecting base flanges, to a support therefor, said assembly comprising:

(a) a generally S-shaped torsional spring rail clip including a singular generally linear central leg, a tie loop having an arcuate portion extending from a first end of said central leg to a terminal leg having a free distal end, and a rail loop having an arcuate portion extending from the second end of said central leg to a terminal leg having a free distal end, said central leg having a length which is less than the sum of the lengths of said tie loop terminal leg and said rail loop terminal leg, said tie loop terminal leg having a length which is less than the length of said rail loop terminal leg; and

(b) a chair positioned adjacent a railway rail, said chair having

(i) anchoring means for securing said chair to said support for said rail,

(ii) a front end and a back end (where said rail clip is driven onto said rail and chair from said front end toward said back end) with a tie side and a rail side extending between said ends,

(iii) a head means extending from said front end of said chair toward said back end, said head means having a jaw means facing toward one of said sides of said chair for receiving at least a portion of said central leg when said rail loop terminal leg engages said rail base flange and said tie loop terminal leg engages said chair,

(iv) a ramp means disposed on said tie side of said head means for engaging said tie loop terminal leg when said clip is placed on said rail and said chair and then driven into position, said ramp means rising from said front end of said chair to a point disposed behind the front-most end of said head means, at which point said ramp first exerts an upwardly directed force on said tie loop terminal leg urging said central leg against said jaw means whereby said head means is disposed between said central leg and the distal end of one of said terminal legs of said rail clip before said central leg is urged against said jaw means.

4,715,535
POWDER SPRAY GUN

Douglas C. Mulder, Wellington, Ohio, assignor to Nordson Corporation, Amherst, Ohio

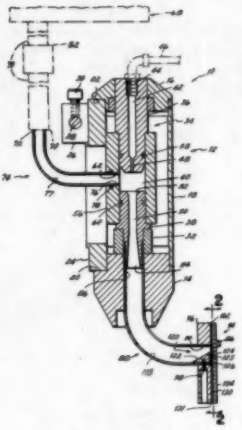
Filed Apr. 28, 1986, Ser. No. 856,758
Int. Cl.[4] B05B *7/14*
U.S. Cl. 239—1 **17 Claims**

1. A powder spray gun for spraying air-entrained particulate powder material comprising:

a gun body having a powder inlet and a powder outlet;

means for connecting said powder inlet of said gun body to a source of air-entrained particulate powder material;

a conduit having an inlet end connected to said powder outlet of said gun body for receiving particulate powder material and an outlet end, said conduit having a bend between said inlet end and said outlet end, said bend having an outer wall on one side of said conduit, the particulate powder material in the course of flow through said conduit being concentrated in a powder flow stream along said outer wall of said bend in said conduit;



a spray head mounted to said outlet end of said conduit, said spray head being formed with a powder discharge slot terminating in a powder spray orifice;

deflector means mounted within said conduit for contacting and directing said concentrated stream of particulate powder material into a predetermined portion of said powder discharge slot of said spray head and out said powder spray orifice for dispersion onto a substrate.

4,715,536
DISPENSER FOR THE SLOW RELEASE OF VOLATILE PRODUCTS

Amedeo Capizzi; Pia Spinelli, both of Milan, and Emilio Arsura, San Donato Milanese, all of Italy, assignors to Montedison S.p.A., Milan, Italy

Continuation of Ser. No. 751,854, Jul. 5, 1985, abandoned. This application Aug. 26, 1986, Ser. No. 900,262
Claims priority, application Italy, Jul. 6, 1984, 21783 A/84
Int. Cl.[4] A61L *9/04*
U.S. Cl. 239—54 **1 Claim**

1. A multilayer dispenser, provided with openings, having a size of 2 cm on a side and a thickness ranging between 0.4 and 2 mm, for the slow release of volatile pheromones comprising an adsorbing substrate consisting of polyethylene fibrils alone or combined with cellulose fibers containing the active ingredient adsorbed or dispersed therein and coated on the two faces with a multi-layer polyester-aluminum-polyethylene film which is impermeable to pheromones and in which the polyethylene layer is hot-welded to the substrate.

4,715,537

SPRAY TIP

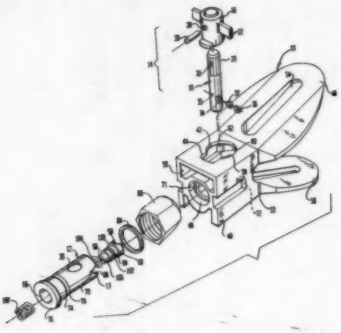
Oliver J. Calder, Orange, Calif., assignor to Phyllis Graham, Orange, Calif.

Continuation-in-part of Ser. No. 662,615, Oct. 19, 1984, abandoned, which is a continuation-in-part of Ser. No. 575,153, Jan. 30, 1984, Pat. No. 4,537,355, which is a continuation of Ser. No. 457,919, Jan. 14, 1983, Pat. No. 4,484,707, which is a continuation-in-part of Ser. No. 442,525, Nov. 18, 1982, Pat. No. 4,483,481, which is a continuation of Ser. No. 165,247, Jul. 2, 1980, abandoned. This application Aug. 16, 1985, Ser. No. 766,190

The portion of the term of this patent subsequent to Nov. 20, 2001, has been disclaimed.

Int. Cl.[4] B05B *15/02*

U.S. Cl. 239—119 **14 Claims**



13. A spray tip comprising:

(a) a housing subassembly of:

(i) a housing having a longitudinal through passageway and an intersecting cylindrical orthogonal bore; and

(ii) a plastic spray guard having a pair of outwardly diverging winds dependent from a spray guard body having a longitudinal through cavity received over said housing, a through transverse bore in said spray guard body aligned with said orthogonal bore of said housing;

(b) a cylindrical turret member having a transverse through bore, and rotatably seated in the aligned orthogonal and transverse bores of said housing and spray guard body;

(c) a handle member permanently secured to said turret member with a lip member radially projecting therefrom; and

(d) a lip receiving cavity in the upper portion of said spray guard body having a slotted aperture opening thereto in alignment with said transverse bore to receive said lip member with one interior wall of said lip receiving cavity having internal shoulders at 180 degree spacing for abutment stops when the transverse through bore of said turret member is in alignment with said through passageway of said housing.

4,715,538

SWIRL JET NOZZLE AS A HYDRAULIC WORK TOOL

Horst Lingnau, Duisburg, Fed. Rep. of Germany, assignor to Woma-Apparatebau Wolfgang Maasberg & Co., GmbH, Duisburg, Fed. Rep. of Germany

Filed Apr. 3, 1985, Ser. No. 719,419

Claims priority, application Fed. Rep. of Germany, Apr. 3, 1984, 3412319

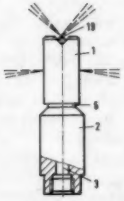
Int. Cl.[4] B05B *3/06*

U.S. Cl. 239—248 **9 Claims**

1. Apparatus for producing a swirling jet of pressurized liquid for use in the removal of solid material from an adjacent surface comprising:

a stator including a body with a first portion having a first cross-sectional area at a first end thereof, said body also including a neck portion extending from said first end of said first portion, said neck portion having a longitudinal axis and an average cross-sectional area which is smaller than said first cross-sectional area, at least a part of the first end of said first portion of said body which is contiguous to said neck portion defining a reaction surface, said stator being adapted for coupling at a second end of said body first portion which is disposed oppositely with respect to said first end to a source of pressurized liquid, said body in part defining a supply conduit for said liquid which extends through said first portion and into said neck portion, said supply conduit terminating at a discharge port in said neck portion oriented transversely to said axis, said stator neck portion further having a circumferential groove in the exterior thereof;

a rotor having an elongated internal cavity sized and shaped to receive said stator neck portion, said rotor being coaxial with said stator neck portion and having oppositely disposed first and second ends, said rotor having at least a first jet defining discharge port in the first end thereof, said discharge port having an axis which is angularly oriented with respect to said stator neck portion axis, said



rotor having at least a first flow passage for the pressurized liquid which extends between an inner surface thereof which faces the stator neck portion and said first jet defining discharge port whereby pressurized fluid discharged through said discharge port in said stator neck portion will be delivered to said rotor first jet defining discharge port, said rotor further defining a second flow passage for said pressurized liquid between said inner surface thereof and the second end thereof, said rotor second end having a surface which is disposed oppositely to and in facing relationship to said stator reaction surface, said rotor first end including a face portion which defines a plane oriented substantially transversely with respect to the stator neck portion axis, and said face portion having a generally V-shaped groove formed therein, said first jet defining discharge port being located in a side wall of said generally V-shaped groove; and

a retainer captured in said rotor, said retainer including a pin which extends linerarly across a portion of the internal cavity in said rotor, said pin intercepting said circumferential groove in said stator neck portion to capture said rotor on said stator while permitting relative rotation therebetween.

4,715,539

HIGH-PRESSURE WATER JET TOOL AND SEAL

Curtis C. Steele, P.O. Box 44, Trenton, Ohio 45067

Filed Dec. 11, 1986, Ser. No. 940,299

Int. Cl.[4] B05B *3/02*

U.S. Cl. 239—263 **9 Claims**

1. Means for providing a seal between the end of a non-rotating section and the end of a rotating section of a high-pressure hydraulic supply line which comprises:

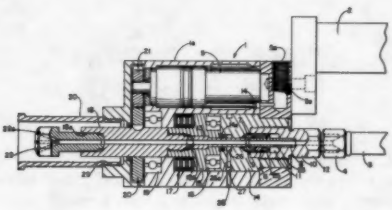
an axially aligned cavity holding a seal member, said cavity having a centrally positioned opening at its forward wall to receive said rotating section of said supply line,

said forward wall converging toward said central opening,

a plug member which forms the rear wall of said cavity, said plug member having a centrally positioned opening to receive said non-rotating section of said supply line,

said seal member having a centrally positioned bore,

said end of said rotating section and said end of said non-



rotating section of said supply line being held in abutting alignment in said bore of said seal member, and

means for introducing high-pressure hydraulic fluid between the rear face of said seal member and the face of said plug member in said cavity to thereby force said seal member forward in said cavity against said converging wall of said cavity to thereby compress said seal member around said two ends of said supply line.

4,715,540

FUEL-INJECTION NOZZLE

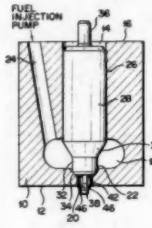
Hiroshi Miyake, Osaka, Japan, assignor to Daihatsu Motor Company Limited, Osaka, Japan

Continuation of Ser. No. 567,010, Dec. 30, 1983, abandoned. This application Mar. 26, 1986, Ser. No. 843,830

Claims priority, application Japan, Jan. 17, 1983, 58-6254

Int. Cl.[4] F02M *47/00*

U.S. Cl. 239—533.3 **6 Claims**



1. A fuel-injection nozzle for injecting pressurized fuel into the combustion chamber of an internal combustion engine, comprising:

a nozzle body having a guide hole, a fuel accumulation chamber to receive pressurized fuel, an injection hole communicating with the fuel accumulation chamber and opening to the combustion chamber, and a body seat provided between the fuel accumulation chamber and the injection hole, wherein the guide hole, fuel accumulation chamber, body seat and injection hole are coaxially arranged;

a nozzle needle which is slidably fitted within the guide hole and which extends into the accumulation chamber, and which further has a needle seat at one end and is urged to make the needle seat contact the body seat to close the injection hole, and

a needle pin coaxially projected from said end of the nozzle needle into the injection hole so that an annular gap is defined between the outer periphery of the needle pin and the inner periphery of the injection hole, the needle pin having a tapered portion progressively slenderized toward the combustion chamber for varying the rate of fuel injection through the annular gap when pressurized fuel in the fuel accumulation chamber urges the needle away from the body seat, and at least two flat surfaces on the outer periphery, the flat surfaces each at constant distance from a plane that is both parallel to the flat surface and contains the longitudinal axis of the needle pin; said flat surfaces extending from the needle seat of the nozzle needle along a portion of the needle pin for defining a series of wide and narrow sections around the annular gap; the maximum gap between at least one of the flat surfaces and the inner periphery of the injection hole being smaller than those between the other flat surfaces and the inner periphery of the injection hole;

the wide sections formed by the flat surfaces and inner periphery of the injection hole being of such shape whereby injected fuel passing therethrough is caused to be made up of particles of diverse sizes.

4,715,541

FUEL INJECTION NOZZLE FOR COMBUSTION ENGINES

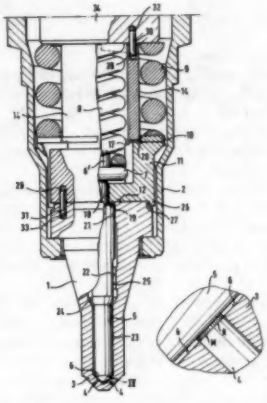
Otto Freudenschuss, Vienna; Günther Herdin, Steyr; Harald Schmidt, Vienna, and Emerich Schreiner, Steyr, all of Austria, assignors to Steyr-Daimler-Puch AG, Vienna, Austria

Filed Feb. 25, 1986, Ser. No. 833,218

Claims priority, application Austria, Feb. 26, 1985, 566/85; Nov. 8, 1985, 3231/85

Int. Cl.[4] F02M *45/00*

U.S. Cl. 239—533.4 **5 Claims**



1. A fuel injection nozzle for internal combustion engines, comprising

a nozzle body having a longitudinal axis,

a nozzle cap at one end of said nozzle body, said nozzle cap having a fuel ejection bore therein for delivery of fuel to a combustion chamber, said nozzle cap including a valve seat,

a nozzle needles guided within said nozzle body along said axis,

first and second spring means acting in series to bias said nozzle needle towards said valve seat to close said fuel ejection bores, said nozzle needle being displaceable away from said valve seat in a first displacement phase against the force of said first spring means and a second displacement phase against the force of said second spring means, the outer surface area of an imaginary cylinder formed as a projection from said fuel ejection bores against said nozzle needle when said nozzle needle is displaced away from said valve seat being smaller than the cross-sectional

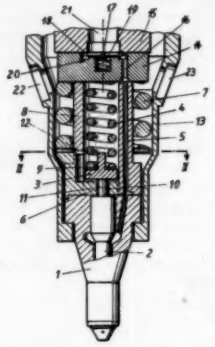
area of said fuel ejection bore throughout said first displacement phase.

4,715,542

FUEL INJECTION NOZZLE FOR INTERNAL COMBUSTION ENGINES

Josef Morell; Otto Freudenschuss, and Harald Schmidt, all of Vienna, Austria, assignors to Steyr-Daimler-Puch AG, Vienna, Austria

Filed Feb. 25, 1986, Ser. No. 833,217
Claims priority, application Austria, Mar. 4, 1985, 628/85
Int. Cl.⁴ F02M *61/20*
U.S. Cl. 239—533.9 **8 Claims**



1. A fuel injection nozzle for internal combustion engines, comprising

a body having an axis,

a nozzle needle guided within said body along said axis, said nozzle needle being movable between an open and a closed position,

a first helical pressure spring biasing said nozzle needle into its closed position, said first helical pressure spring being disposed along said axis,

a second helical pressure spring disposed along said axis and surrounding said first helical pressure spring, said second helical pressure spring being stronger than said first helical pressure spring, said first and second helical pressure springs being arranged eccentrically relative to each other,

a bush disposed eccentrically about said axis between said first and second helical pressure springs, said bush having a wall of non-uniform thickness and including a bore in the region of greatest thickness of the bush wall, said bore being parallel to said axis and delivering fuel under pressure to said nozzle needle to move said nozzle needle away from its closed position, and

a movable stop associated with said nozzle needle for limiting movement of said nozzle needle, said second helical pressure spring acting to limit the movement of said stop.

4,715,543

FLOW RESTRICTOR DEVICE PARTICULARLY USEFUL FOR DRIP IRRIGATION

Isaac Rinkewich, 12 Fishman Maimon St., Tel Aviv, Israel

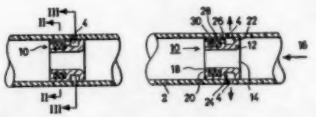
Filed Jan. 27, 1986, Ser. No. 822,876
Int. Cl.⁴ B05B *15/00*
U.S. Cl. 239—542 **20 Claims**

1. A flow restrictor device particularly useful for drip irrigation, comprising:

a disc-shaped member attachable to a pipe containing a pressurized fluid such that one face of the disc-shaped member is subject to the inlet pressure of the pressurized fluid, and an other face is exposed to the atmosphere;

said disc-shaped member being formed with an annular recess in said one face to be exposed to said pressurized fluid, and with a metering passageway leading from said annular recess to said other face to be exposed to the atmosphere;

and a flow restrictor annular member of uniform inner and outer dimensions received within said annular recess to partially cover said metering passageway, said flow restrictor member being deformable in a radial direction under the pressure of the pressurized fluid to restrict said metering passageway under high inlet pressure, and to enlarge said metering passageway under low inlet pressure, and thereby to control the flow of the fluid therethrough, according to the pressure of the fluid at said one face of the disc-shaped member.

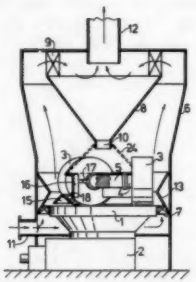


4,715,544

VERTICAL ROLLER MILL

Jan Folsberg, Copenhagen, Denmark, assignor to F. L. Smidth & Co. A/S, Copenhagen, Denmark

Filed Oct. 29, 1986, Ser. No. 924,619
Claims priority, application United Kingdom, Oct. 29, 1985, 8526626
Int. Cl.⁴ B02C *15/00*
U.S. Cl. 241—57 **4 Claims**



1. In a vertical roller mill comprising a grinding table which is rotatable about a vertical axis; at least two grinding rollers which are rotatable about substantially horizontal, stationary axes and are urged against an annular grinding path of said grinding table; and a nozzle ring encircling said table for blowing separating and conveying gas into a mill housing above said grinding table; the improvement wherein a screen is mounted above said grinding path in each circular arc between adjacent ones of said rollers, said screen being formed with an obliquely upwardly and radially inwardly directed outer wall above a radially outer zone of said grinding path and an obliquely downwardly and radially inwardly directed inner wall above a radially inner zone of said grinding path; and wherein a guide wall is mounted above each said screen, said guide wall being formed and placed to collect a portion of material being blown, in use, by the gas from said nozzle ring over and along said outer screen wall and to return at least a coarser fraction of said material down towards said inner screen wall and hence back onto said grinding table adjacent to the radially inner edge of said grinding path, said screen and guide wall being further placed and formed such that there is an annular space between said guide wall and said mill housing and such that, in

use, said separating and conveying gas suspends at least a finer fraction of said material being blown and conveys said at least finer fraction upwardly through said annular space and past said guide wall.

4,715,545

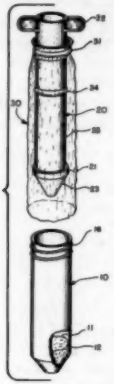
TISSUE GRINDING AND TRANSPORT SYSTEM AND METHOD

Paul H. Hanifl, Barrington, and John J. Newton, Jr., Palatine, both of Ill., assignors to Sage Products, Inc., Cary, Ill.

Filed Feb. 13, 1986, Ser. No. 828,788

Int. Cl.⁴ B02C *23/36*

U.S. Cl. 241—169.1 **15 Claims**



1. A system for collecting and grinding tissue specimens or other biological samples comprise:

an elongate container having an open top portion and rigid side walls defining a hollow interior for receiving the specimen and including a first grinding surface adjacent a bottom wall of the container;

a grinder adapted for fitting into the open top portion of the container and including a second grinding surface engageable with the first grinding surface and further including operating means extending beyond the open top portion of the container when said grinding surface are engaged; and

a protective sheath attached to the grinder and adapted to envelop and seal the opening between the container and the grinder with grinder emplaced within the container;

whereby tissure specimens or other biological samples can be collected in said container and ground between said first and second grinding surfaces when said grinder is rotated within said container by the application of a rotating force to said operating means and said protective sheath thereby prevents the contamination of the specimen or the surrounding atmosphere during the grinding operation.

4,715,546

GRINDING MEDIA CHARGING DEVICE

Robert Holming, Brookfield; Robert S. Nelson, Mequon, and Thomas R. Daley, Nashotch, all of Wis., assignors to Armco Inc., Middletown, Ohio and The Holming Company, Milwaukee, Wis.

Filed Feb. 11, 1987, Ser. No. 17,295

Int. Cl.⁴ B02C *17/18*

U.S. Cl. 241—171 **15 Claims**

1. An apparatus for feeding grinding balls into a ball mill comprising:

a ball storage hopper for new grinding balls,

a regulator,

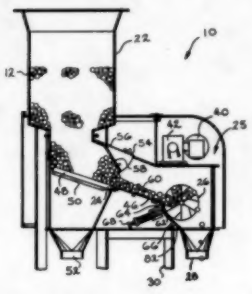
a chute for conveying said balls to said regulator,

said chute having first and second ends,

said first end including a baffle for controlling the depth of said balls on said chute,

said regulator including a discharge drum, means for continuously rotating said drum and a means for retaining said balls in said drum,

said drum being disposed adjacent said second end and including a plurality of compartments adapted to receive said balls,



said retaining means being disposed adjacent to a portion of said drum for retaining said balls in one of said compartments,

whereby said drum is rotated at a predetermined speed to uniformly feed said balls into said mill at a rate that can correspond to the ball attrition rate of said mill.

4,715,547

BALL MILL

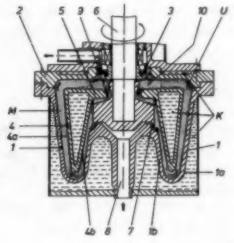
Gerhard Bühler, Rheinfelden, Switzerland, assignor to Fryma Maschinen A.G. Rheinfelden, Rheinfelden, Switzerland

Filed Dec. 3, 1985, Ser. No. 804,264

Claims priority, application Fed. Rep. of Germany, Dec. 6, 1984, 3444575

Int. Cl.⁴ B02C *17/04, 17/18*

U.S. Cl. 241—176 **5 Claims**



1. A ball mill apparatus for the continuous crushing and dispersing of a solid grinding stock which is conveyed along in a fluid, comprising an annular-gap-shaped grinding chamber which is rotationally symmetric with respect to a vertical centre axis, formed between a stator and a rotor coupled to a drive, which chamber has an at least approximately V-shaped cross-section on both sides of the vertical centre axis and is provided with an inlet and an outlet for the circulating grinding stock, with the grinding chamber being partially filled with grinding balls which circulate continuously, together with the grinding stock, under the effect of the rotor rotation during operation of the ball mill, wherein the V-shaped cross-section of the grinding chamber increases in the conveying direction of the grinding stock from the grinding stock inlet to a confluence in an upper, radially inward-leading return-flow chamber.

4,715,548

SPINDLE DRIVE TYPE YARN WINDING APPARATUS

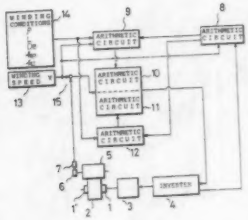
Yuzuru Miyake; Isao Nohara; Takami Sugioka; Susumu Onishi, and Toshiyuki Ueno, all of Matsuyama, Japan, assignors to Teijin Seiki Co., Ltd., Osaka, Japan

Filed May 16, 1986, Ser. No. 864,434

Claims priority, application Japan, May 17, 1985, 60-105292; Jun. 24, 1985, 60-138399

Int. Cl.[4] B65H *54/02, 59/00*

U.S. Cl. 242—18 R 4 Claims



1. A spindle drive type yarn winding apparatus comprising:

motor means for driving a bobbin holder;

inverter means for supplying electric power to said motor;

contact roller means for contacting with and driven by a bobbin inserted on said bobbin holder or a package wound on said bobbin;

controller means for performing at least integral control action to said motor so as to control the rotating speed of said contact roller means at a predetermined value,

setter means for setting a winding speed, density of the wound package, stroke of the wound package and denier of the wound package;

first arithmetic circuit means for calculating a diameter of the wound package;

second arithmetic circuit means for calculating a gain of said controller means based on winding conditions set in said setter means and said diameter calculated in said first arithmetic circuit means; and

altering means for altering the gain of said controller means based on at least one factor set in said setter means and said diameter of said wound package calculated in said first arithmetic circuit means

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4,715,549

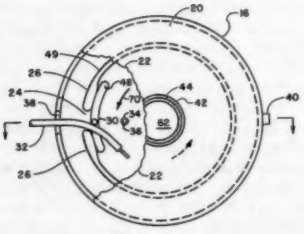
WIRE CARRIER AND LOADING APPARATUS

Constantine M. Travlos, Baltimore, Md., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Apr. 7, 1987, Ser. No. 35,333

Int. Cl.[4] B65H *54/00*

U.S. Cl. 242—25 R 5 Claims



1. Apparatus comprising:

a wire carrier assembly having a wire-carrying spool, a shroud and a shroud retainer;

said spool comprising a hollow cylinder having a first end and a second end and a longitudinal opening extending throughout the wall thereof, a disk-shaped base plate concentrically disposed at said first end of said cylinder and having a tubular hub extending coaxially through and beyond said second end of said cylinder, said base plate further having an arcuate slot therethrough adjacent the interior surface of said wall of said hollow cylinder and spanning said opening in said cylinder, said base plate further having a drive pin hole therethrough and located within the radius of said arcuate slot;

said shroud comprising a circular cover having a mounting hole at the center thereof and a rim extending from a side thereof, said rim having a wire insertion and dispensing port therethrough, said hub on said base plate of said spool extending through said mounting hole in said shroud;

said shroud retainer comprising a ring positioned over the distal end of said tubular hub of said base plate.

4,715,550

METHOD AND APPARATUS FOR CONTROLLING THE EFFECTIVE LENGTH OF THREAD PACKAGES

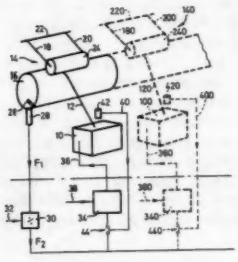
Markus Erni, Winterthur, and Kurt Salvisberg, Gächlingen, both of Switzerland, assignors to Maschinen Abrik Rieter AG, Winterthur, Switzerland

Continuation of Ser. No. 893,562, Aug. 5, 1986, abandoned, which is a continuation of Ser. No. 715,645, Mar. 21, 1985, abandoned. This application Mar. 16, 1987, Ser. No. 26,472

Claims priority, application United Kingdom, Mar. 22, 1984, 8407465

Int. Cl.[4] B65H *63/08*

U.S. Cl. 242—39 6 Claims

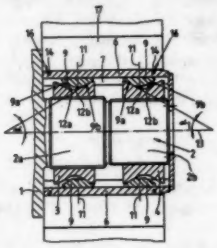


1. A yarn winding apparatus comprising means for rotating a yarn package during a winding operation; means for producing an output signal which is a function of the rotary motion of a predetermined part of said rotating means during the winding operation; adjustably settable means for receiving said output signal and for providing a winding termination signal when the cumulative rotary motion of said predetermined part of said rotating means during the respective winding operation as indicated by said output signal has reached a predetermined level; and means separate from said adjustably settable means and operative for controllably adjusting said output signal prior to reaching said adjustably settable means to correct any deviation between the actual and the desired effective length of the yarn wound into the package.

4,715,551
SELF-LOCKING DEVICE FOR TRANSMITTING TORQUE TO BOBBIN CORES

Alfred Besemann, Hamburg, Fed. Rep. of Germany, assignor to E. C. H. Will (GmbH & Co.), Hamburg, Fed. Rep. of Germany

Filed Apr. 21, 1987, Ser. No. 40,867
Claims priority, application Fed. Rep. of Germany, Apr. 26, 1986, 3614286
Int. Cl.[4] B65H *54/54, 75/24*
U.S. Cl. 242—46.4 **11 Claims**

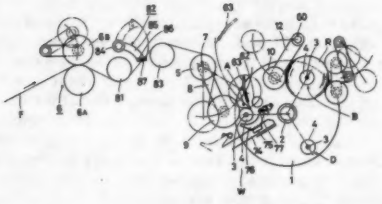


1. A self-locking device for transmitting torque to the internal surface of a tubular component, such as the hollow core of a bobbin, comprising a rotor having external threads; first and second nuts having internal threads mating with said external threads, said threads being such that joint rotation of said nuts with reference to said rotor in a selected direction entails an axial movement of said nuts relative to each other; torque transmitting means including at least two torque transmitting members outwardly adjacent said nuts and having external surfaces engageable with the internal surface of the tubular component and inner sides facing said nuts, said nuts having outer sides adjacent said inner sides and said inner and outer sides having cooperating cam faces arranged to move said members substantially radially outwardly and away from said rotor in response to rotation of said nuts in said selected direction so that the external surfaces of said members bear against the internal surface of the tubular component; and means for biasing said members substantially radially inwardly toward said rotor.

4,715,552
MULTI-SPINDLE WINDER

Yukimichi Matsumoto, Hirakata, Japan, assignor to Kabushiki Kaisha Fuji Tekkosho, Osaka, Japan

Filed Apr. 23, 1986, Ser. No. 856,071
Int. Cl.[4] B65H *19/20, 19/16, 19/28*
U.S. Cl. 242—56 A **2 Claims**



1. A multi-spindle winder of a surface winding-center winding system, comprising:

multi-spindle turrets each having a plurality of winding spindles fitted thereon with winding cores located between a first winding station and a second winding station thereon;

a first contact roller on arms oscillatably mounted to make press contact with at least one of said winding cores to wrap a leading end of a given length of a transparent stretch film fed from a feed roller onto said one winding core in order to initiate winding at said first winding station, said first contact roller being rotatably driven while being in contact with said one winding core from said first winding station to an intermediate station between said first and second winding stations;

a second contact roller oscillatably mounted to make press contact with a wound roll transferred by the turning motion of said multi-spindle turrets thereby to wind up the given length of the film into a transparent roll product at said second winding station, said second contact roller being driven to rotate by a drive means and being in contact with the wound roll from said intermediate station to said second winding station and changed over from said first contact roller at said intermediate station;

a cam for contacting said arms which supports said first contact roller for facilitating a receding of said first contact roller from said intermediate station;

means for forcing said first contact roller to return from said intermediate station to said first winding station;

speed control means for controlling the rotation of said drive means of said second contact roller;

film cutting means for severing the fully wound roll, said film cutting means being located rearwardly of said one winding core at said first winding station; and

automatic wrapping means for wrapping the leading cut end of the film around an empty winding core, including a film guiding member having an arcuate guide face and air nozzles capable of injecting air rearwardly of the moving area of the film cutting means toward the space between said film guiding member and said empty core;

said cam being actuated interlocking with the turning motion of said multi-spindle turrets and having a guide profile which limits a displacement magnitude of said first contact roller so as to increase the variation magnitude in path length of the film stretching from said feed roller via said first contact roller to said one winding core being wound in proportion to the turning angle of said multi-spindle turrets,

said speed control means serving to control said drive means so as to impart, immediately before press contact, a peripheral speed slightly faster than said first contact roller to said second contact roller and, after press contact, a peripheral speed gradually increasing at an increment proportional to the turning angle of multi-spindle turrets during movement from said intermediate station to said second winding station, whereby winding is accomplished under a constant tension without air being entrapped in the roll products.

4,715,553
ROLL CORE HOLDING DEVICE

Tetsuo Hatakeyama, Tama; Yoshinori Uera, Matsudo, and Nobuaki Nagao, Kawasaki, all of Japan, assignors to Kabushikigaisha Tokyo Kikai Seisakusho, Tokyo, Japan

Filed Aug. 22, 1986, Ser. No. 899,995
Claims priority, application Japan, Sep. 2, 1985, 60-134164
Int. Cl.[4] B65H *75/24;* **B23B** *31/40*
U.S. Cl. 242—68.4 **5 Claims**

1. A roll core holding device for each end of a roll core comprising:

a shifting means;

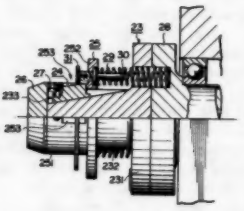
a center member capable of shifting in response to the shifting means and comprising a base section, a shaft section protruding from the base section and a plurality of grooves formed in the shaft section from the top to the base;

a plurality of pawls capable of shifting along the shaft section of the center member for widening the space between the adjacent pawls as they are shifted toward the base section, each pawl being slidably engaged within each

groove of the center member so that the space between the adjacent pawls becomes wide as the pawls slide toward the base section of the center member and each pawl becomes completely embedded in each groove as the pawls slide toward the top of the shaft section;

an external member slidably mounted on the shaft section of the center member and comprising a cylindrical section and a flange section, the cylindrical section being formed with a plurality of openings through which a head portion of the pawls can appear;

a retaining member which contacts a side end of the roll core in order to retain the core;



a pressing means which is penetratingly arranged through the flange section of the external member from the base section of the center member so as to support the retaining member and to press the flange section toward the top of the center member from the base section thereof to urge the pawls toward the top of the shaft section;

an urging means for urging the pressing means toward a top side thereof; and

a stopper secured at the top of the shaft section of the center member.

4,715,554

FISHING LINE SUPPLY SPOOL AND METHOD OF USE

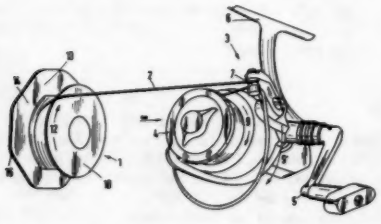
Rupert Kuntze, Kudowastrasse 9, D-1000 Berlin 33, Fed. Rep. of Germany

Filed Apr. 10, 1986, Ser. No. 850,177

Claims priority, application Fed. Rep. of Germany, Aug. 9, 1985, 3528616

Int. Cl.[4] A01K *89/00*; B65H *54/00*

U.S. Cl. 242—84.2 R **12 Claims**



1. An antitwist system for transferring fishing line from a supply spool to a fishing reel comprising:

(a) a fishing reel having winding means rotatable about an axis in a first direction of rotation when viewed from an operator's position behind the fishing reel;

(b) a supply spool comprising: (i) a generally cylindrical portion having first and second edges; (ii) a first flange extending radially outwardly from and fixedly attached to the first edge, the first flange having a first lateral dimension and a substantially circular periphery; and, (iii) a second flange extending radially outwardly from and fixedly attached to the second edges, the second flange having a non-circular periphery and at least one lateral dimension greater than the first lateral dimension, the supply spool adapted to be non-rotatably oriented such that the first flange faces the fishing reel;

(c) a supply of fishing line wound onto the cylindrical portion of the supply spool in a second direction opposite to the first direction of rotation when viewed from the operator's position, the supply having a free end; and,

(d) means to attach the free end of the fishing line to the fishing reel such that, as the winding means are rotated about the axis in the first direction of rotation, the fishing line is wound onto the fishing reel in the first direction and unwound from the non-rotating supply spool in contact with the periphery of the first flange in the first direction as viewed from the operator's position whereby the twist in the line caused by the winding on the fishing reel is opposite to the twist caused by unwinding from the supply spool so as to minimize the twist imparted to the fishing line.

4,715,555

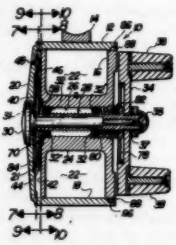
DUAL MODE FISHING REEL ASSEMBLY

Robert L. McChristian, Jr., 10896 SW. 188 St., Miami, Fla. 33157

Filed Nov. 24, 1986, Ser. No. 933,981

Int. Cl.[4] A01K *89/02*

U.S. Cl. 242—84.5 R **5 Claims**



1. A fishing reel assembly having a direct drive and automatic anti-reversing capabilities, said assembly comprising:

(a) a reel frame including mounting means for securing said reel frame to a fishing rod,

(b) a spool including an inner face and a centrally disposed bore extending therethrough and structured to contain fishing line thereon,

(c) a crankshaft having an innermost and an outermost end, said crankshaft positionable through said bore in coaxial relation to said spool and rotatably connected to said reel frame at said innermost end thereof, said spool rotatably supported on said crankshaft,

(d) a crank arm secured to said outermost end of said crankshaft in adjacent and spaced relation to said reel frame and rotatable with said crankshaft relative to said reel frame,

(e) automatic anti-reversing means, including a disc element secured to said crankshaft, for preventing reverse rotation of said crankshaft and comprising a first structure secured to said reel frame and a second structure comprising a plurality of teeth formed on the periphery of said disc element for rotation therewith, said first and second structures cooperatively disposed and constructed for instant abutting engagement with one another upon reverse rotation of said spool,

(f) direct drive means for accomplishing forward rotation of said spool upon forward rotation of said crankshaft by said crankarm,

(g) said direct drive means comprising a plurality of lugs fixedly formed on said spool and a plurality of drive arms pivotally mounted a substantially one end thereof so as to rotate with said crankshaft, an opposite end of each drive

arm configured and pivotally disposable into abutting, direct driving engagement with said plurality of lugs,

(h) said plurality of drive arms disposable between an operative position, during forward rotation of said crankshaft and an inoperative position during reverse rotation of said crankshaft, said operative position defined by direct driving engagement of said plurality of drive arms with a corresponding number of said plurality of lugs and said inoperative position defined by disengagement of said plurality of drive arms from said plurality of lugs.

(i) said direct drive means further comprising a cam member secured to said crankshaft structure so as to rotate therewith, said cam member disposed in adjacent and engageable relation to said plurality of drive arms and configured for concurrent movable engagement with said plurality of drive arms between said operative position and said inoperative position,

(j) said pluralilty of lugs formed on said inner face of said spool in surrounding relation along the periphery of a recessed cutout portion on said inner face, said plurality of lugs disposed in spaced relation to one another and extending radially inward therefrom towards said plurality of drive arms,

(k) said plurality of drive arms disposed at least partially within said cutout portion and in surrounded relation by said plurality of lugs, said lugs spaced sufficiently close to allow immediate driving engagement of said drive arms with said respective lugs, said spool being forced into forward rotation by said direct drive meansupon forward rotation of said crankshaft and said drive means being instantly disengaged from said lugs upon reverse rotation of said crankshaft,

(l) said spool rotating freely within said reel frame upon said drive arms being instantly disengaged from said lugs wherein said drive means is in said inoperative position, and

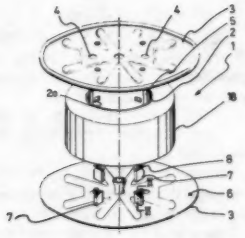
(m) said plurality of drive arms pivotally mounted in abutting, driving engagement with said cam member for limited outward disposition into abutting engagement with said plurality of lugs and out of engagement with said periphery of said cutout portion, whereby jamming engagement between said spool and said plurality of drive arms is prevented.

4,715,556

SPOOL

Rufin Tack, Deerlijk, and Marc Eggermont, Aalter, both of Belgium, assignors to N.V. Bekaert S.A., Zwevegem, Belgium

Filed Mar. 19, 1986, Ser. No. 841,221
Claims priority, application Belgium, Apr. 1, 1985, 1/011224
Int. Cl.[4] B65H *75/18*; B25G *3/20*
U.S. Cl. 242—118.6 **8 Claims**



1. A spool comprising:

a central portion, and

two flanges attachable thereto by fastening means,

each flange having an innerside and an outerside and being provided with said fastening means located on the innerside of at least one of the flanges and being attachable to an innerside of the central portion,

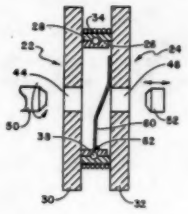
the fastening means comprising supports provided with a spring and a clamp (10), said clamp coacting with said spring.

4,715,557

WIRE CONTAINER

Frank C. Rushing, Columbia, and Mark Weixel, Ellicott City, both of Md., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Feb. 11, 1987, Ser. No. 13,819
Int. Cl.[4] B65H *49/00, 75/14, 75/28*
U.S. Cl. 242—129 **6 Claims**



1. Wire containing apparatus comprising:

first and second members each having a cylindrical drum and a flange of circular cross section concentric with said drum and disposed on one end thereof;

said drum of said first member having an outer diameter substantially equal to the inner diameter of said drum of said second member and being positioned within said drum of said second member;

retainer means disposed between said drums of said first and second members to retain the drum of said first member within the drum of said second member while permitting rotational motion therebetween;

container registration means situated at the axis of said flanges of said first and second members respectively,

anti-rotation means disposed between the inner side of said flange of said second member and the inner wall of said drum of said first member; and

wire clamping means disposed on the side wall flange of said first and second members.

4,715,558

SINGLE PIECE TAPE REEL AND ASSEMBLY

Kenneth E. Fair, and Charles M. Campbell, both of Opelika, Ala., assignors to Ampex Corporation, Redwood City, Calif.

Filed Feb. 24, 1986, Ser. No. 832,927
Int. Cl.[4] G03B *1/04*; B65H *75/18*
U.S. Cl. 242—199 **12 Claims**

1. A reel for storage of magnetic tape adapted to be mounted on a rotatable splined spindle of a magnetic tape recording apparatus comprising:

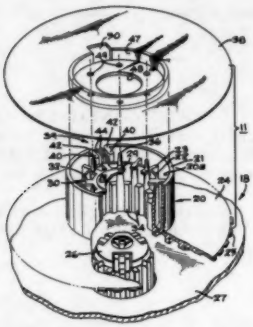
a one piece hub member including a hub having a central hub portion, an attached flange, and an integral top cover portion, the hub portion having a central opening;

a plurality of splines circumferentially disposed about and extending axially along the interior of the central opening of the hub portion in spaced relation for engaging the spindle;

the top cover portion overlying the central opening, and having access opening therein overlying the splines; and

said splines being truncated at respective upper ends thereof

adjacent the top cover portion, to define a series of recesses between the top cover portion and respective upper



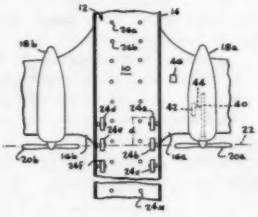
surfaces of the splines, concentric with the central opening for receiving an engaging member of the spindle.

4,715,559

APPARATUS AND METHOD FOR GLOBAL NOISE REDUCTION

Christopher R. Fuller, 312 Reynolds St. Apt. 3, Blacksburg, Va. 24060

Filed May 15, 1986, Ser. No. 863,937
Int. Cl.[4] A61F *11/02*
U.S. Cl. 244—1 N **24 Claims**



1. Apparatus for attenuating sound radiated from a vibrating surface intoa control volume surrounded by the vibrating surface, said apparatus comprising:

(a) means for providing a control signal indicative of the frequency and amplitude of the sound radiated from said vibrating surface into said control volume;

(b) vibrating means directly connected to said vibrating surface for further vibrating said vibrating surface to induce a cancelling sound into said control volume for combining with an attenuating said radiated sound;

(c) detecting means disposed within said control volume for detecting the combination of said cancelling and said radiated sound to provide an error signal indicative thereof; and

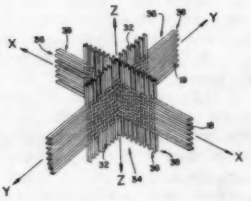
(d) control means responsive to said error signal for adaptively modifying said control signal as to phase and amplitude and for applying said modified control signal to drive said vibrating means, whereby said error signal is driven to a minimum level.

4,715,560

COMPOSITE CRUCIFORM STRUCTURE FOR JOINING INTERSECTING STRUCTURAL MEMBERS OF AN AIRFRAME AND THE LIKE

Ernie F. Loyek, Sparks, Nev., assignor to Lear Fan Limited, Reno, Nev.

Continuation of Ser. No. 475,140, Mar. 14, 1983, abandoned, which is a continuation-in-part of Ser. No. 142,118, Apr. 21, 1981, abandoned. This application Dec. 13, 1984, Ser. No. 681,712
Int. Cl.[4] B64C *1/06*
U.S. Cl. 244—177 R **17 Claims**



1. An aircraft structure comprising non-intersecting structural elements and intersecting structural elements, the intersecting structural elements being of a composite cruciform structure having intersecting structural members, and the non-intersecting structural elements being elongated planar elements extending between and overlapping adjacent structural members of adjacent intersecting structural elements of the cruciform structure, said cruciform structure comprising a first bundle of fibers interwoven with a second bundle of fibers and additional fibers interwoven with each of said first and second bundles of fibers in a direction substantially perpendicular to the fibers of said first and second bundles, to form said cruciform structure, said fibers having a reinforcing resin on the surface thereof to provide a strong substantially rigid structure joinder of said structural members without a substantia1 break in the continuity of the fibers and to provide substantially even load bearing and force transmitting capability in a plurality of directions with respect to said intersection of sid structural members.

4,715,561

DRAIN ASSEMBLY FOR AIRCRAFT

Dominic J. Spinosa, Wantagh, N.Y., and Frank Knoll, Huntington Station, both of N.Y., assignors to East/West Industries, Inc., Hauppauge, N.Y.

Filed Nov. 3, 1986, Ser. No. 926,466
Int. Cl.[4] B64C *1/00*; F16K *31/122*
U.S. Cl. 244—129.1 **24 Claims**

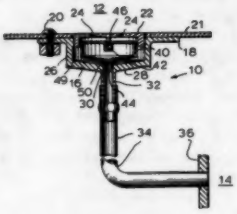
1. Drain assembly for use in a pressurized compartment environment, said drain assembly being normally operable at first compartment pressure which is any pressure below a certain predetermined value to provide fluid communication between the interior of said compartment and the extra compartment environment, and said drain assembly further operable to seal against said fluid communication at a second compartment pressure which is any pressure above said certain value, said drain assembly comprising:

a housing defining a well space open to the compartment and

having an outlet communicating with a point outside said compartment,

a flotation device, said well space having volume sufficient to hold said flotation device along with an amount of liquid which floats the device at first compartment pressure,

said flotation device having size, shape and weight to fit in said well and when floated provides a fluid drain course



between said compartment and outside point at first compartment pressure whereby liquid entering said housing from said compartment passes through said outlet to said outside point, and

sealing means provided to cooperate with said housing and said floatation device to permit passage of liquid through said fluid drain course at first compartment pressure and to seal said fluid drain course at second compartment pressure.

4,715,562

MECHANISM FOR AUTOMATICALLY ACTUATING A RESCUE DEVICE UPON OPENING OF AN EXIT DOOR

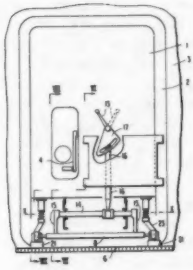
Jean Bokalot, Toulouse, France, assignor to Societe Nationale Industrielle Aerospatiale, Paris, France

Filed Jan. 22, 1986, Ser. No. 821,259

Claims priority, application France, Jan. 24, 1985, 85 01012

Int. Cl.[4] B64C *1/34*

U.S. Cl. 244—137.2 **6 Claims**



1. Mechanism for automatically actuating a rescue device upon opening of a panel obturating an exit and bearing said rescue device and said mechanism, said panel undergoing a movement cf lifting, or of rotation or of lifting combined with a rotation at the moment of opening, said mechanism comprising:

a voluntary actuating member having a first and a second position;

a control bar connected to said rescue device and substantially parallel to said panel;

a movable assembly actuated by said actuating member, said movable assembly being releasably connected to said control bar and adapted to push or draw said control bar, so that said control bar can occupy a first end position remote to said panel when said actuating member is in its first position and a second and position near said panel when said actuating member is in its second position;

fork elements freely supporting said control bar in its first end position;

said mechanism being associated with hook elements fixed to the periphery of said opening and adapted to receive said control bar in its second end position, said control bar being transferred by said movable assembly from said fork elements to said hook elements when said voluntary actuating member moves from its first position to its second position.

4,715,563

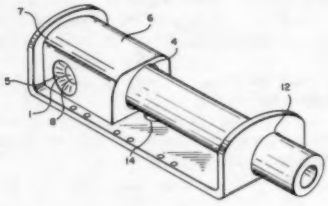
REEFING LINE PRESSURE REDUCER

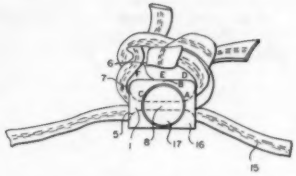
Ronny A. Quamen, Yuma, Ariz., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Aug. 25, 1986, Ser. No. 900,062

Int. Cl.[4] B64D *17/00*

U.S. Cl. 244—152 **4 Claims**





1. In a reefing line cutter assembly having

a cutter bracket;

a reefing line cutter held in place by said cutter bracket with a first channel for receiving a reefing line, means for cutting said reefing line, a second channel for receiving said cutting means, and means in said second channel for actuating said cutting means; the improvement characterized by a reefing line pressure reducer comprising:

an element of substantially rectangular cross section;

a reefing line channel within said element for receiving the ends of said reefing line which loop through said reefing line channel and terminate in a knot juxtaposed against said element;

and a cutter channel within said element, perpendicular to and intersecting with said reefing line channel, for receiving means for cutting said reefing line;

wherein said cutter channel engages said reefing line cutting means, and said reefing line channel and said first channel align for receiving the reefing line; and

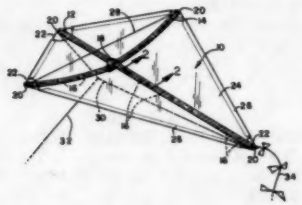
wherein said pressure reducer element has smooth rounded edges and has the cross-sectional shape of a pillow to cause the reefing line adjacent to the tie-off area circumscribed by the knot to be subjected to less stress than said elements containing edges with shorter radii.

4,715,564

CHEMILUMINESCENT KITE

John J. Kinn, and Donna A. Kinn, 17 Peregrine Dr., Voorhees, N.J. 08043

Filed Jan. 24, 1986, Ser. No. 822,362
Int. Cl.[4] B64C *31/06*
U.S. Cl. 244—153 R **15 Claims**



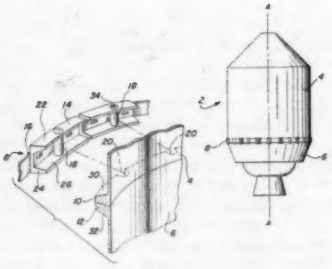
1. A chemiluminescent kite comprising
a cover sheet for providing aerodynamic lift,
a frame comprising a plurality of support members, said support members providing support for said cover sheet, and
attachment means for connecting said cover sheet to said support members,
wherein at least one of said support members is a light transmitting container adapted to hold therein a source of chemiluminescent light.

4,715,565

CLAMPING CONNECTION ASSEMBLY FOR SPACECRAFT

Alois Wittmann, Palos Verdes, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed May 27, 1986, Ser. No. 866,812
Int. Cl.[4] B64G *1/64*
U.S. Cl. 244—158 R **10 Claims**



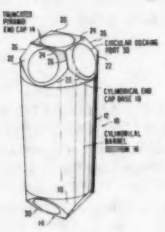
1. In a spacecraft having first and second separable components joined by a tension strap V-clamp assembly so as to be held together along an axial direction while subject to both axial loads and bending moments, the improvement of a connection assembly comprising:
a first flange member having a first detent on the first spacecraft component; flange members to hold them together; and
a second flange member having a second detent on the second spacecraft component;
a retainer member for transmitting the radial force of the tension strap to the first and second flange members to hold them together; and
a shear pin mounted on the retainer member for engaging the complimentary first and second detents, the shear pin and detents cooperatively preventing relative rotational movement between flange members, the shear pin being capable of transmitting shear and torsional forces without increasing the axial load created by the tension strap or locking the connection assembly to prohibit a predetermined release.

4,715,566

INTERCONNECTABLE SPACE STATION MODULE AND SPACE STATION FORMED THEREWITH

William O. Nobles, Littleton, Colo., assignor to Martin Marietta Corporation, Bethesda, Md.

Filed Oct. 29, 1985, Ser. No. 792,387
Int. Cl.[4] B64G *1/10*
U.S. Cl. 244—159 **10 Claims**



1. An interconnectable manned space station module for interconnection into a variety of space station configurations without need for dedicated interconnect modules, which is lightweight, strong and stiff and which provides readily available access ports for both inplane connection and offplane docking of service modules and the like thereto, said module comprising:
an elongated module body,
end caps mounted to respective ends of said body,
said end caps being in the form of a four sided truncated pyramid having a truncated side forming a flat, square central end face remote from said body and at right angles to the longitudinal axis of said body, and four flat oblique side faces integral with and about the four sides of the central end face.

4,715,567

SYSTEM FOR COUPLING TWO FLAPS OF AN AIRCRAFT WING, AND AN AIRCRAFT WING EQUIPPED WITH SUCH A SYSTEM

Jacques Poccard, Levignac, France, assignor to Aerospatiale Societe Nationale Industrielle, Paris, France

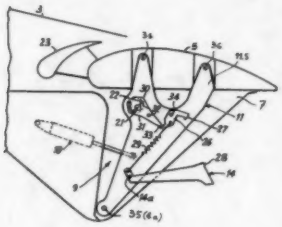
Filed Dec. 8, 1986, Ser. No. 939,140
Claims priority, application France, Dec. 13, 1985, 85 18515
Int. Cl.[4] B64C *9/02*
U.S. Cl. 244—213 **7 Claims**

1. A system for coupling together two flaps of an aircraft wing, adjacent and at least substantially aligned along said wing, each flap having its own pivoting and drive means, said system comprising:

first mechanical coupling means (12, 15) intended to ensure the synchronized operation of said two flaps;

second mechanical emergency coupling means (13, 21, 22) able to take over the function of said first mechanical coupling means in case of failure thereof, said second mechanical emergency coupling means being disposed between said adjacent flaps and including at least one finger (21) integral with one of said flaps and engaged, with a predetermined play, in a recess (22) provided in the other flap;

at least one mechanical device (14) intended for signaling the transfer of function between said first and second mechanical coupling means, said mechanical device having at



least one lever able to move between two positions, the first of which corresponds to normal operation of said first mechanical coupling means, in which position the lever is not visible, and the second of which corresponds to a failure of said first mechanical coupling means, in which position the lever is visible;

a controllable bolt (26) for locking said lever in its first non-visible position; and

sensor means (30, 31) for detecting the position of said finger (21), said sensor means causing release of the locking between said bolt and said lever when said first mechanical coupling means fails, thus allowing said lever to take its second visible position.

4,715,568

EXPANSIBLE PITON

Donald D. Best, Jr., Escalon, Calif., assignor to David A. Hornbeck, Reno, Nev., a part interest

Division of Ser. No. 778,571, Sep. 20, 1985, abandoned. This application Aug. 5, 1986, Ser. No. 893,214

Int. Cl.[4] A62B *29/08*

U.S. Cl. 248—1 **2 Claims**

1. An expansible piton for use in a rock crevice comprising:

a. a primary plate having a first rock-contacting surface;

b. positioning means extending along a longitudinal axis and attached to said primary plate for moving said primary plate from a distant location with said first rock-contacting surface against one side of the crevice, said positioning means including a hand loop, a cable extending along said longitudinal axis, said cable being attached at one end to said primary plate and at the other end to said hand loop, and a sleeve on said axis of said cable intermediate said primary plate and said hand loop;

c. a secondary body having a second rock-contacting surface, said primary plate and said secondary body being further defined therebetween by a wedge surface and an abutting surface disposed slidably to contact said wedge surface, said wedge surface and said abutting surface being disposed between said first and second rock-contacting surfaces;

d. moving means attached to said secondary body for selectively moving said secondary body in a direction parallel to said longitudinal axis and in a direction transverse thereto, said moving means including a rocker slidable on said cable between said sleeve and said hand loop, said rocker being initially oriented transversely relative to said longitudinal axis, and a pair of operating cables translatably extending through said sleeve from said rocker to said secondary body in a direction initially parallel to said longitudinal axis, said cables being spaced apart to provide a moment arm capable of rotating said secondary body in respons to rotation of said rocker.

4,715,569

FASTENING MECHANISM FOR MOUNTING OPERATING EQUIPMENT AND THE LIKE

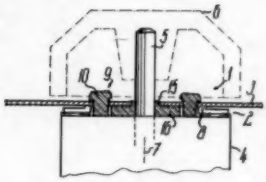
Willi Essig, Boeblingen; Robert Kicherer, Oberderdingen, and Hans Mayer, Kuernbach, all of Fed. Rep. of Germany, assignors to EGO Elektro-Geräte Blanc u. Fischer, Fed. Rep. of Germany

Filed Jun. 10, 1986, Ser. No. 872,513

Claims priority, application Fed. Rep. of Germany, Jun. 15, 1985, 3521634; Apr. 19, 1986, 3613295

Int. Cl.[4] G12B *9/00*

U.S. Cl. 248—27.1 **24 Claims**



1. A fastening mechanism for mounting an equipment body of a piece of operating equipment, such as control equipment, electrical power control switching means and the like in the vicinity of at least one opening on a panel, the opening being defined by a boundary, said fastening mechanism comprising:

holding members associated with the equipment body and supported against opposite associated sides of the panel in a fastening position,

said holding members having supporting surfaces for support purposes,

at least one holding member being provided as a tension member engaging the associated side of the panel with pretension due to a supporting force occurring in the fastening position,

at least one tension member being arranged in an at least slightly movable manner on the equipment body with respect to the boundary of the opening,

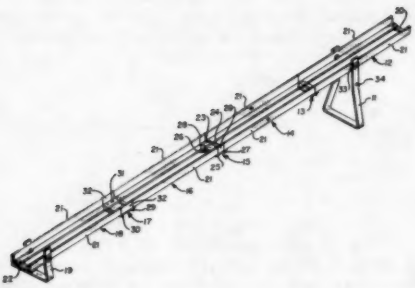
wherein at least one of the tension members has a head portion provided on a shank portion passing through the opening, said head portion forming at least one of the supporting surfaces, the tension member in the fastening position being resiliently movable of itself by means of at least one articulation zone provided in the tension member, thereby compensating in the fastening position the position of the supporting surface with respect to the panel under the supporting force occurring.

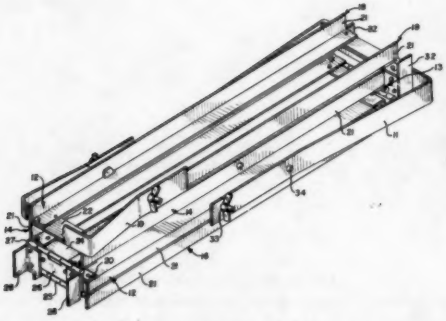
4,715,570

FOLDABLE DRAIN HOSE SUPPORT

David Mashuda, 130 Wisconsin Ave., Evans City, Pa. 16033

Filed Jul. 7, 1986, Ser. No. 882,306
Int. Cl.[4] F16L 3/00
U.S. Cl. 248—49 5 Claims





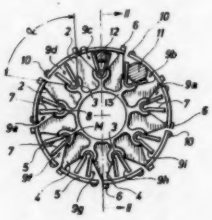
1. A foldable support trestle for flexible fluid conduit comprising a series of at least four stretcher sections connected end-to-end by first, second and third hinge sections respectively, the first stretcher section being connected to the second stretcher section by the first hinge section so that the first and second stretcher sections can be folded against each other, the second stretcher section being connected to the third stretcher section by the second hinge section, said second hinge section being a double pin hinge section with an additional stretcher section between said pins so that the second and third stretcher sections can be folded parallel to each other but separated sufficiently to admit the first stretcher section between them, the third stretcher section being connected to the fourth stretcher section by the third hinge section, said third hinge section being a double pin hinge section with an addition stretcher section between said pins so that the third and fourth stretcher sections can be folded parallel to each other but separated sufficiently to admit the folded first and second stretcher sections between them.

4,715,571

DEVICE FOR SECURING A PLURALITY OF ELECTRICAL CONDUCTORS OR CABLES

Uwe Soltow, Hamburg; Hans-Peter Guthke, Steinkirchen; Hans-Georg Plate, Roseburg; Johann Lechner, Hamburg, and Safa Kirma, Wedel, all of Fed. Rep. of Germany, assignors to Messerschmitt-Boelkow-Blohm Gesellschaft mit beschraenkter Haftung, Munich, Fed. Rep. of Germany

Filed Dec. 6, 1985, Ser. No. 806,284
Claims priority, application Fed. Rep. of Germany, Dec. 13, 1984, 3445489
Int. Cl.[4] F16L 3/22
U.S. Cl. 248—68.1 7 Claims



1. A device for securing a plurality of electrical conductor in a predetermined position to form a conductor bunch prior to final installation of the conductor bunch, comprising a single piece disk made of elastically yielding synthetic material and having a central opening and a ring zone around said central opening, a first plurality of recesses in said ring zone of said single piece disk for receiving said conductors, a further plurality of leaf spring type rim sections made of elastically yielding material, elastic hinge means securing said leaf spring type rim sections to said single piece disk, said leaf spring type rim sections extending around said ring zone for closing said first plurality of recesses and holding said conductors in said first plurality of recesses with an elastically yielding radially effective biasing force at least until final installation, said single piece disk including means for attaching said single piece disk to a mounting member.

4,715,572

TRASH BAG RETAINER AND AIR VENTING DEVICE

Edward S. Robbins, III, 459 N. Court St., Florence, Ala. 35630, and Gary T. Schwertner, St. Joseph, Tenn., assignors to Edward S. Robbins, III, Florence, Ala.

Filed Mar. 30, 1987, Ser. No. 31,659
Int. Cl.[4] B65B 67/04
U.S. Cl. 248—101 42 Claims

1. A device for securing a flexible liner within a trash receptacle for the type having a side wall and an open top, said device comprising:

a rim having an inner surface defining an interior cavity which is sized and configured to receive the top of said

receptacle and an upper region of the flexible liner drapped thereover;

said rim including retaining means having at least one pair of ribs spaced apart from one another along said rim and projecting into said interior cavity thereof, each for removably securing said rim to the top of said receptacle and for holding a localized portion of said flexible liner against the top of said receptacle, such that another portion of said liner between said localized portions thereof is substantially unsecured against the top of said receptacle,

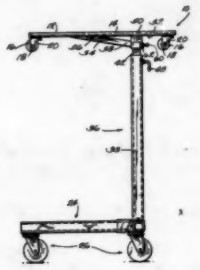
wherein said retaining means establishes a space between said another portion of the liner and said inner surface of said rim, and wherein said retaining means allows said substantially unsecured another portion to flex into said established space thereby forming a vent between said unsecured another portion and the receptacle top to permit air trapped between the liner and the side wall of the receptacle to escape therethrough.

4,715,573

CONVERTIBLE TOOL TRAY AND SUPPORT STAND FOR MECHANICS TOOL

Reinald D. Liegel, Waukesha, Wis., assignor to Hein-Werner Corporation, Waukesha, Wis.

Filed Nov. 26, 1986, Ser. No. 934,997
Int. Cl.[4] A47G *29/00*
U.S. Cl. 248—129 **7 Claims**



1. A tool tray assembly for use in supporting tools used by a mechanic beneath a vehicle, the tool tray assembly comprising:

a tool tray having an upper surface adapted for use in supporting a plurality of mechanics tools, and said tool tray including a bottom surface,

means for supporting the tool tray for movement along the ground, the means for supporing including a plurality of wheels attached to said bottom surface of said tool tray and adapted to independently support said tool tray for movement along the ground.

a base,

means for supporting said base for movement along the ground,

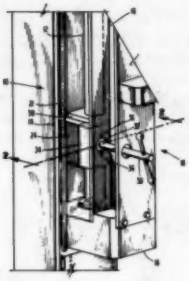
a vertically extending member supported by said base and extending upwardly from said base, said vertically extending member including an upper end, and means for removably mounting said tool tray on said upper end of said vertical member with said tool tray and said plurality of wheels supported above the ground, said means for removably mounting said tool tray on said upper end of said vertical member including a mounting member fixed to the bottom surface of said tool tray, said mounting member being releasably engageable with said upper end of said vertically extending member so as to removably support said tool tray on said upper end.

4,715,574

SAFETY LOCK FOR MATERIALS HANDLING SYSTEM

Alyn R. Holt, and Robert E. Matthiessen, both of Cherry Hill, N.J., assignors to inTest Corporation, Cherry Hill, N.J.

Filed Nov. 12, 1985, Ser. No. 796,911
Int. Cl.[4] B25J *1/12*
U.S. Cl. 248—297.1 **16 Claims**



10. A safety lock system for preventing unlocking of a balanced loaded unit mounted on and locked to a vertical shaft when said loaded unit becomes unbalanced, said safety lock system comprising:

a lock block having a bore adapted for mounting said lock block on said shaft for movement of said lock block along said shaft;

locking means projecting through the wall of said bore for engaging said shaft to lock said lock block against vertical movement along said shaft;

a rotatable handle coupled to said locking means for engaging said shaft with said locking means upon rotation of said handle in one direction and for disengaging said locking means from said shaft upon rotation of said handle in an opposite direction;

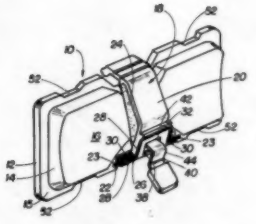
and safety locking means adapted to be secured to said loaded unit and movable with said loaded unit for preventing rotation of said handle upon a preselected movement of said loaded unit relative to said lock block.

4,715,575

EYEGLASS HOLDER

Larry Kamerer, 1413 Old Ford Rd., New Albany, Ind. 47150

Filed Dec. 10, 1986, Ser. No. 940,441
Int. Cl.[4] A47F *5/00*
U.S. Cl. 248—309.1 **4 Claims**



1. An eyeglass holder comprising:

a backing plate;

resilient means on one planar surface of the backing plate;

clamping finger means pivotally attached to the backing plate for movement between a first position transversely overlaying the one planar surface of the backing plate having the resilient means and a second position away from the one planar surface of the backing plate having the resilient means;

biasing means for biasing the clamping finger toward the first position;

a resilient latch arm; and

means on the clamping finger for engagement with the resilient latch arm for releasably holding the clamping finger in the second position.

4,715,576

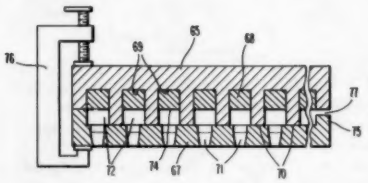
APPARATUS FOR FORMING A FLEXIBLE MASK

Max R. Montierth, Elmira, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Division of Ser. No. 533,604, Sep. 19, 1983, which is a division of Ser. No. 283,734, Jul. 15, 1981, Pat. No. 4,411,856. This application May 2, 1985, Ser. No. 729,755

Int. Cl.[4] B29C *39/02*

U.S. Cl. 249—60 **7 Claims**



1. A die for forming a flexible mask comprising a body having a pair of opposing outer surfaces, a plurality of openings extending through and between said pair of opposing outer surfaces and a plurality of protrusions extending from one of the opposing outer surfaces, said die comprising:

first die means for forming said plurality of openings;

second die means positioned against said first die means for forming said plurality of protrusions, said first and second die means forming a cavity to define said mask, and

stripping means positioned within said cavity for removing said flexible mask after being formed.

4,715,577

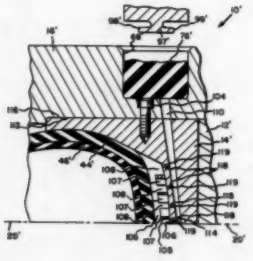
APPARATUS FOR INJECTION MOLDING TIRE TREADS

Alan Greenwood, Kent, and Norbert Majerus, Akron, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 760,937, Jul. 31, 1985, Pat. No. 4,604,256. This application Apr. 21, 1986, Ser. No. 853,975

Int. Cl.[4] B29C *45/14*

U.S. Cl. 249—107 **5 Claims**



1. Apparatus for injection molding a tread portion of a tire, said apparatus comprising a heated mold having a tread molding ring member, said mold containing an annular tread molding space having a molding surface on said tread molding ring member, axially extending tread molding ring runner passages disposed in said tread molding ring member at circumferentially spaced positions separated from said molding surface, said runner passages extending from at least one edge of said ring member to a centerplane of said mold and being tapered from a larger diameter at said edge of said ring member to a smaller diameter at a centerplane of said mold, said runner passages being in communication with a source of fluid molding compound, and a plurality of axially spaced gate orifices located along each of said runner passages and in communication with said tread molding space.

4,715,578

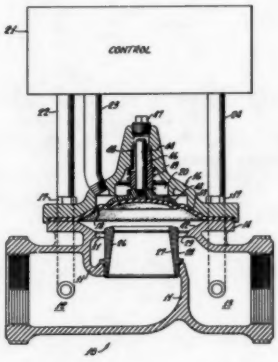
DIAPHRAGM VALVE

Clyde W. Seltzer, Newport Beach, Calif., assignor to Cla-Val Company, Costa Mesa, Calif.

Filed Dec. 22, 1986, Ser. No. 944,976

Int. Cl.[4] F16K *31/128*

U.S. Cl. 251—25 **18 Claims**



1. A pilot-operated diaphragm valve, which comprises:

(a) a valve body having an inlet and an outlet,

(b) a valve cover,

(c) a diaphragm mounted, at its periphery, between said body and cover,

the central regions of said diaphragm being adapted to move tranversely of the peripheral regions thereof,

(d) a combination diaphragm seat and diaphragm support sealingly mounted in said valve body at the opening between said inlet and outlet thereof, on the opposite side of said diaphragm from said cover,

said valve body, and said combination diaphragm seat and diaphragm support, defining between them a substantially unconstricted flow annulus, said combination diaphragm seat and diaphragm support including a circumferentially continuous sealing lip adapted to be sealingly engaged by said diaphragm,

(e) means on said combination diaphragm seat and diaphragm support to support said diaphragm at regions thereof radially-inwardly of, and adjacent, said flow annulus when said diaphragm is seated on said combination seat and support,

said support means (e) being spaced from said lip sufficiently that said diaphragm will seal against said lip without touching said combination seat and support at regions outwardly adjacent said sealing lip, when said diaphragm is seated on said lip and on said support means (e),

(f) means on said valve body to support said diaphragm, at regions radially-outwardly of, and adjacent, said flow annulus when said diaphragm is seated on said combination seat and support,

said support means on said valve body being sufficiently low that, when there is a high pressure differential across said diaphragm and said diaphragm is fully

seated on said combination diaphragm seat and diaphragm support, said diaphragm will bend downwardly around the outer portion of said support means (e) and into said substantially unconstricted flow annulus, and

(g) means to vary the fluid pressure in the chamber defined by said cover and said diaphragm, to cause opening and closing of said valve.

4,715,579

RADIATOR VALVE INCORPORATING PRESETTING MEANS

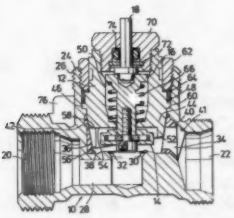
Curt Hammarstedt, Alstermo, Sweden, assignor to Tour & Andersson AB, Johanneshov, Sweden

Filed Feb. 13, 1987, Ser. No. 14,667

Claims priority, application Sweden, Feb. 17, 1986, 8600679

Int. Cl.[4] F16K *47/08*

U.S. Cl. 251—121 **10 Claims**



1. A radiator valve incorporating presetting means for the quantity of a fluid flowing through said valve, comprising a valve body (10) with a presetting spindle (12) having a shield member (52), the height of the shield member varies circumferentially whereby the shield member can be adjusted to close a larger or smaller part of a flow opening (34) of said valve to achieve a desired preset, and incorporating a valve cone (14) being moveable via a spindle (16) and a piston (18) to control the distance of the valve cone to an adjacent valve seat (30), wherein said valve has a conical seat (38) for receiving a cooperating conical portion (44) of said presetting spindle (12), said conical portion incorporating said shield member (52) and said conical seat incorporating said flow opening (34).

4,715,580

SWINGING DEVICE

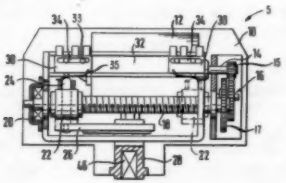
Fritz Mueller, Neuer Wasen 6, 7118 Ingelfingen-Criesbach, Fed. Rep. of Germany

Filed Feb. 17, 1987, Ser. No. 15,222

Claims priority, application Fed. Rep. of Germany, May 6, 1986, 3615368

Int. Cl.[4] F16K *31/04, 31/53*

U.S. Cl. 251—229 **13 Claims**



1. A swinging device for transmitting swinging motion to an element of a shut-off valve or the like for opening and closing the latter, comprising:

a casing,

a rotatable spindle member extending within said casing; and

oscillating means adapted to cooperate with the element and operatively connected with said spindle member for swinging between two end positions in such a manner that a maximum torque is exerted on the element when said oscillating means is in said end positions, said oscillating means including a nut adapted to move along said spindle member between said end positions, an oscillating crank having one end and another end, said one end being pivotally connected directly to said nut and moving along a straight line without being shifted toward said casing when said crank is moved between said end positions, and a coupling member operatively connected to said element and cooperating with said other end of said crank in such a manner that said coupling member is slidably received in said crank in a non-rotational manner so as to achieve said straight line movement for preventing said shifting.

4,715,581

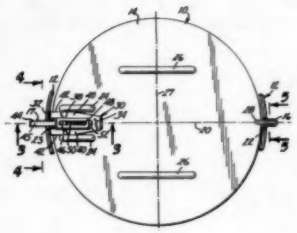
DAMPER CONSTRUCTION

Jerome J. Myers, Maple Grove, Minn., assignor to Sheet Metal Connectors, Inc., Minneapolis, Minn.

Filed Mar. 23, 1987, Ser. No. 28,879

Int. Cl.[4] F16K *1/22*

U.S. Cl. 251—308 **13 Claims**



1. A damper for pivotally mounting in a pair of diametrically opposite aligned pivot openings provided in opposite sides of an air duct, said damper including:

A. a generally flat damper blade having an outer periphery generally congruent with the inner periphery of the air duct on a plane normal to the longitudinal axis of the duct and passing through said pivot openings;

B. a first pivot pin integral with and extending outwardly from the blade in direction so that it passes through one of the pivot openings as the damper is being installed in the duct;

C. the damper blade being provided with integrally formed positioning bead means lying in aligned relation to the axis of the first pivot pin at a side portion of the damper blade opposite the first pivot pin, said bead means extending out of the plane of the damper blade;

D. a damper clip adapted to be mounted on the damper blade and including a second pivot pin, said damper clip being provided with second pivot pin alignment means cooperative with the bead means for aligning the second pivot pin with the first pivot pin to provide a pivot axis for the damper blade; and

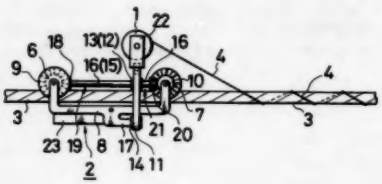
E. means for permanently attaching the damper clip to the damper blade when positioned by the damper blade positioning bead means.

4,715,582

METHOD OF WINDING OPTICAL CABLE ON AERIAL WIRE

Akitoshi Ikeda, Tokorozawa; Chitoshi Nishimura, Kawasaki; Norio Katsuoka, Tokyo, and Masami Obara, Nikko, all of Japan, assignors to The Furukawa Electric Co., Ltd., Tokyo, Japan

Filed Apr. 2, 1986, Ser. No. 847,271
Claims priority, application Japan, Apr. 3, 1985, 60-69171
Int. Cl.[4] B65H 59/00
U.S. Cl. 254—134.3 CL 7 Claims



1. A method of winding an optical cable on an aerial wire, comprising the steps of:

providing an optical cable wound on a spool, the optical cable having a preset twist in one direction;

providing a means for winding the optical cable on the aerial wire; and

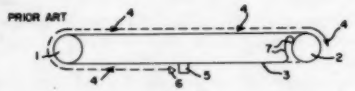
winding the optical cable on the aerial wire in a direction opposite to the direction of the preset twist of the optical cable, whereby the preset twist opposes the twist induced by the winding of the optical cable on the aerial wire so that twisting stress on the optical cable is minimized.

4,715,583

TENSION FIXTURE FOR A CURTAIN

Hans Grützner, Kehrsatz, Switzerland, assignor to K. Bratschi, Silent Glias, Muri near Berne, Switzerland

Filed Feb. 8, 1985, Ser. No. 699,663
Claims priority, application Switzerland, Feb. 9, 1984, 623/84
Int. Cl.[4] A47H 5/02; B66D 1/395
U.S. Cl. 254—283 12 Claims



1. A tensioning device for use with a curtain having an endless traverse which is longitudinally movable in both directions responsive to a rotational drive means and which is subject to elongation resulting from strain:

wherein said rotational drive means includes at least two driving gears which are operatively coupled with a common drive shaft by a freewheeling coupling such that when either one of said driving gears is operated, the other of said driving gears rotates freely; and

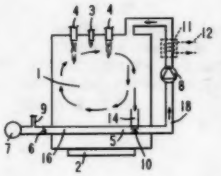
wherein said elongation is caused to extend from between said driving gears.

4,715,584

FURNACE FOR MELTING METALS

Andrianus J. Hengelmolen, Dreumel, Netherlands, assignor to Hengelmolen Engineering B.V., Dreumel, Netherlands

Filed Jan. 25, 1984, Ser. No. 573,570
Claims priority, application Netherlands, Jan. 26, 1983, 8300288
Int. Cl.[4] C21C 5/38
U.S. Cl. 266—155 4 Claims



1. A furnace for sequentially pre-heating and melting a charge of metal, comprising

a furnace chamber having at least one closable supply opening for introducing a contaminated charge of metal into the furnace chamber wherein the furnace chamber is adapted for sequential pre-heating and melting cycles for the metal charge,

means for discharging gas from the furnace chamber,

a recycle conduit connected directly between the gas discharging means and the furnace chamber,

a fan incorporated in the recycle conduit for producing a recycle stream of the discharged gas in the recycle conduit directly to the furnace chamber and to the charge therein at a rate sufficient to ensure substantially optimum convection transfer of heat to the metal,

heat source means for heating the gas of the recycle stream to a first temperature sufficient to gasify metal contaminants, but insufficient to melt the metal during the preheating cycle and to a second temperature sufficient to melt the metal during the melting cycle,

a stack,

a stack conduit connected between the gas discharging means and the stack,

a controllable valve incorporated in the stack conduit, and

pressure gauge means responsive to the pressure in the furnace chamber for operating the controllable valve to keep the furnace chamber pressure at a predetermined value.

4,715,585

METHOD AND APPARATUS FOR FORMING LADLE WELL BLOCKS

Joseph Simko, 6303 New Jersey, Hammond, Ind. 46323

Continuation-in-part of Ser. No. 774,090, Sep. 9, 1985, abandoned. This application Sep. 19, 1986, Ser. No. 909,822
Int. Cl.[4] C21C 5/44
U.S. Cl. 266—273 11 Claims

1. Improved apparatus for forming a well block in a well in a vessel for holding molten metal, comprising:

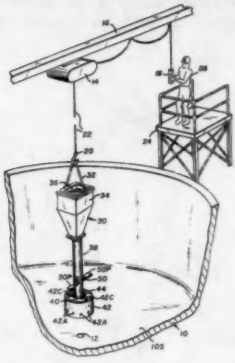
a hopper sized to receive a charge of sand sufficient to at least fill the well;

a chute connected to the hopper for allowing the discharge by gravity of sand held therein and for delivering it out of a chute opening;

a valve unit for closing and opening communication between the hopper and the chute;

a movable unit mounted below and about the chute opening such that the movable unit is the lowest most projection of the apparatus, said movable unit being mounted so that it may rise up relative to the chute when the apparatus is

lowered onto a surface, and being sized to fit about the well;



means responsive to the rising movement of said movable unit for operating said valve unit to open communication between the hopper and the chute.

4,715,586

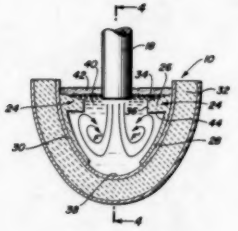
CONTINUOUS CASTER TUNDISH HAVING WALL DAMS

Manfred Schmidt, Bethlehem, Pa., and Theodore W. Fenicle, Chesterton, Ind., assignors to Bethlehem Steel Corporation, Bethlehem, Pa.

Filed Feb. 18, 1987, Ser. No. 16,913

Int. Cl.[4] B22D *11/10, 41/02, 41/08*

U.S. Cl. 266—275 **2 Claims**



1. In a tundish for use in the continuous casting of a molten metal and comprising a curved bottom portion having one or more nozzles for transferring said molten metal into a mold, upstanding curved sidewalls and flat end walls to define an elongated trough containing a quantity of molten metal, the improvement comprising in combination therewith the provision of a refractory lining, each sidewall being provided with a refractory dam member, said dam member comprising a curved vertical portion positioned against said refractory lining and a flange portion projecting substantially horizontally inwardly and having a downwardly sloping upper surface, where said flanges are positioned below the operating surface level of said molten metal but above the midpoint of the depth of said molten metal in said tundish.

4,715,587

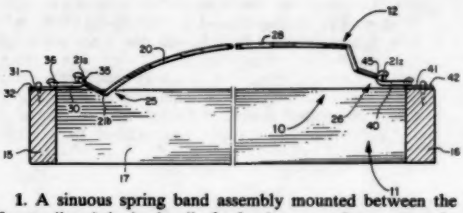
SINUOUS BAND AND SEAT SPRING ASSEMBLY

Lawton H. Grosby, Lake Bluff, Ill., assignor to Morley Furniture Spring Corporation, Lake Bluff, Ill.

Filed Apr. 7, 1986, Ser. No. 848,787

Int. Cl.[4] A47C *23/16*

U.S. Cl. 267—103 **10 Claims**



1. A sinuous spring band assembly mounted between the front rail and the back rail of a furniture seat frame, comprising:

(a) a normally arced sinuous spring band stretched out between the front rail and the back rail;

(b) said band being a regular loop sinuous band including a series of generally linear wire segments spaced about seven-eighths of an inch apart and interconnected by a series of generally semi-circular wire segments;

(c) said interconnected wire segments defining a front bend complex in said band, a back bend complex in said band, and a body in sand band extending between said bend complexes;

(d) said back bend complex including a downwardly and rearwardly inclined inner leg having an upper end and a lower end, and an outer leg having an inner end joined to said lower end and an outer end spaced from said inner end, said upper end of said inner leg joining the body of said band;

(e) back rail connecting means including a horizontally elongated member pivotably connected to said outer end of said outer leg and to said back rail;

(f) said front bend complex including an upwardly and forwardly inclined leg having a lower end joining the body of said band an upper end; and

(g) front rail connecting means including a horizontally elongated member pivotably connected to said upper end of said front bend complex leg and to said front rail.

4,715,588

ROLLING-TYPE BELLOWS FOR VEHICULAR PNEUMATIC CUSHIONING

Gunter Drescher; Gerhard Fankhänel, both of Hanover, and Wolfgang Gnirk, Lehrte, all of Fed. Rep. of Germany, assignors to Continental Gummi-Werke Aktiengesellschaft, Hanover, Fed. Rep. of Germany

Filed May 2, 1986, Ser. No. 859,051

Claims priority, application Fed. Rep. of Germany, May 3, 1985, 3515942

Int. Cl.[4] F16F *9/04*

U.S. Cl. 267—122 **1 Claim**

1. A rolling-type bellows for vehicular pneumatic cushioning in a direction of movement for a roll fold between support means; said bellows having walls with an outer surface and being in the form of an essentially cylindrical hose body that is made of rubber or rubber-like synthetic material in which reinforcing members are disposed; said bellows in combination further comprises:

two oppositely disposed end beads, at least one of which is drawn-in somewhat to provide an opening of reduced diameter, with an annular support surface being provided adjacent to each of said end beads; in the installed state of said bellows, said annular support surfaces, the width of which can vary, being movable relative to one another; and

raised ribs spaced from one another by a distance that corresponds to a multiple of the width of one of said ribs that are integrally provided on the outer surface of said bellows particularly in the region of both said annular support surfaces thereof; said ribs extending at least essentially in the axial direction of said bellows as well as raised surface portions provided as crosspieces extending parallel to one another and at substantially right angles to said ribs in a transverse direction relative to said ribs, said crosspieces projecting beyond the outer wall of the bellows to a lesser extent than do said ribs in the region of both said annular support surfaces; rather than making support surface contact over the entire surface, the walls of the bellows roll directly, as upon rails, on said support means only via said raised ribs that extend in the direction of movement and, as a result, on one hand, there is enhanced kink-free continuous movement of the roll fold, which is curved about a radius, and on the other hand any unavoidable wear is also kept at a minimum and, moreover, any increase of mechanically or otherwise caused surface tears is effectively prevented and for a self-cleaning effect said raised ribs also counteract any clogging of foreign bodies such as grains of sand and little stones between said ribs with avoidance of accompanying danger of excessive wear and localized destruction of the wall of the bellows; each of said ribs having a rectangular cross-sectional shape and each of said ribs projects beyond the outer surface of said bellows to a height that corresponds to a small fraction of the thickness of said hose body that forms said bellows, said surface portions being successively disposed, equidistantly from one another, in a uniform distribution.

4,715,589

CONNECTING DEVICE COMPRISING A BOLT AND A LOOP AROUND THE BOLT

Rudolf Woerndle, Brunnthal, Fed. Rep. of Germany, assignor to Messerschmitt-Boelkow-Blohm Gesellschaft mit beschraenkter Haftung, Munich, Fed. Rep. of Germany

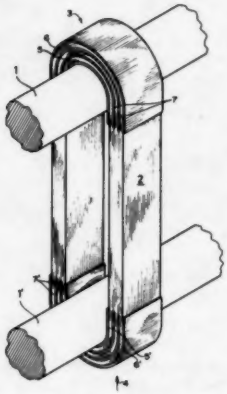
Continuation of Ser. No. 656,546, Oct. 1, 1984, abandoned. This application Feb. 2, 1987, Ser. No. 14,081

Claims priority, application Fed. Rep. of Germany, Oct. 25, 1983, 3338654

Int. Cl.[4] F16F *1/42*

U.S. Cl. 267—148 **6 Claims**

1. A connecting device, comprising bolt means and a loop having two loop legs and at least one looping bight connected to said loop legs, said bight looping around the bolts means, said loop legs and loop bight forming a laterally open space, said loop including a matrix of synthetic material and unidirectional fibers embedded in said matrix of synthetic material, said looping bight further including reinforcing fiber layer means directly embedded in said matrix of synthetic material, said reinforcing fiber layer means being located exclusively in a looping range formed by said looping bight around said bolt means so that said loop legs are free of said reinforcing fiber layer means, said unidirectional fibers of said loop having a fiber orientation extending substantially tangentially relative to and around said bolt means in said loop bight, said reinforcing fiber layer means having at least one main fiber orientation extending at least approximately in a longitudinal direction of said bolt means in said loop bight so that the fibers in said reinforcing fiber layer means extend mainly about coaxially with the respective bolt means for increasing the resistance of said matrix of synthetic material against contractions in said looping range around said bolt means and for preventing a squeeze-out of matrix material out of said loop bight when said loop legs are pulled so as to press said bight against said bolt means.



4,715,590

POSITIONING DEVICE FOR THE INSTALLATION OF DOOR FRAMES, WINDOW FRAMES OR THE LIKE

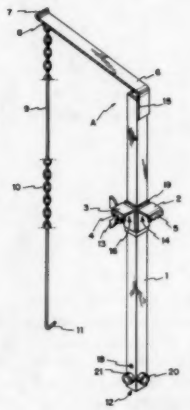
Juan B. M. Segarra, Les Casetes 78, Masamagrell (Valencia), Spain

Filed Jul. 10, 1986, Ser. No. 884,242

Claims priority, application Spain, Nov. 25, 1985, 290.517

Int. Cl.[4] B25B *1/02*

U.S. Cl. 269—76 **14 Claims**



1. Apparatus for pre-positioning frames for doors, windows or the like with respect to a fixed surface remote from the frame to be positioned, said apparatus comprising:

an elongate, first member positionable along a first axis parallel to an axis of the frame;

a second member, carried on said first member, said first and second members being movable with respect to each other

along said first axis, said second member having a first claw adapted to engage over the frame, siad first claw extending outwardly from said second member along a second axis orthogonal to said first axis, and means for releasably fastening said second member to said first member along said first axis; and

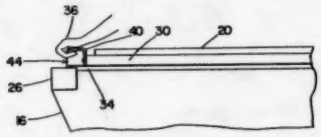
cantilevered biasing means connected to one end of said first member with the free end of said cantilevered biasing means engageable with the fixed surface, whereby said biasing means is adapted to hold said apparatus and the frame in a predetermined position with respect to the fixed surface.

4,715,591

PATIENT SUPPORT FOR RADIATION IMAGING

Kenneth J. Dragmen, Sr., South Euclid, Ohio, assignor to Picker International, Inc., Cleveland, Ohio

Filed Apr. 10, 1986, Ser. No. 850,021
Int. Cl.[4] A61G *13/00*
U.S. Cl. 269—322 **5 Claims**



1. A table assembly for use in medical diagnostic examinations of patients, said table assembly comprising:

a. a main support structure;

b. a patient support member defining a planar examining surface having a longitudinal dimension;

c. means for movably mounting the patient support member to the main support structure for movement along a path substantially parallel to the longitudinal dimension of the patient support member and maintaining a clearance space between said main support structure and said patient support member; and

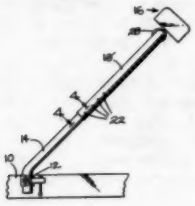
d. means for discouraging inadvertent placement of patient fingers in said clearance space, said means comprising a shroud defining a finger placement space remote from said clearance space fixedly attached to said support member, said shroud extending above said clearance space but not substantially above said planar examining surface and further extending beyond the end of said support member.

4,715,592

ACCOUCHEMENT APPARATUS

Julie M. Lewis, 1760 Oak St., Lake Oswego, Oreg. 97034

Continuation of Ser. No. 806,124, Dec. 6, 1985, abandoned, which is a continuation of Ser. No. 612,321, May 21, 1984, abandoned. This application Sep. 22, 1986, Ser. No. 910,802
Int. Cl.[4] A61G *13/00*
U.S. Cl. 269—328 **5 Claims**



1. Accouchement apparatus for disposition on an underlying horizontal support, the accouchement apparatus configured to engage and support the woman in an upright position on the underlying horizontal support during labor and delivery, the accouchement apparatus comprising:

(a) a U-shaped frame having an intermediate horizontal upper body support portion and laterally spaced vertically extending legs of sufficient length to position said horizontal upper body support portion above an underlying horizontal support a distance sufficient to support the vertical extending upper body of a woman kneeling or squatting on the underlying horizontal support with the arms of the woman hanging over said horizontal upper body support portion, the legs comprising two telescoping sections arranged for longitudinal adjustment for varying the elevation of the horizontal upper body support portion above an underlying horizontal support to accommodate use by women of different heights,

(b) a resilient pad secured to the intermediate upper body support portion of the frame for engagement by the vertically extending upper body of a woman kneeling or squatting on the underlying horizontal support and leaning against the padded upper body support portion for support in an upright position during labor and delivery,

(c) said intermediate portion of the frame comprising two separate lateral sections, an outer hollow sleeve member slidably and rotatably receives said two separate sections telescopically therein for varying the spacing between the legs, securing means on the outer sleeve member releasably engages the two separate sections and secures them releasably to the sleeve member, whereby the sleeve member may be secured to the two separate sections in selected positions of rotation of the sleeve member, and the pad is rigidly secured to the sleeve member for rotation therewith, and

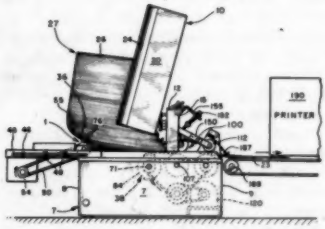
(d) means on the legs for engaging an underlying horizontal support to support the frame in vertically extending position with the resilient upper body support pad disposed substantially horizontally a spaced distance above the underlying horizontal support sufficient to engage and support the vertically extending upper body of a woman kneeling or squatting on the underlying horizontal support for the woman in upright position leaning against the padded upper body support portion during labor and delivery.

4,715,593

STACK-SUPPORTING BOTTOM FEED CONVEYOR

Edward S. Godlewski, 129 S. Spruce St., Wooddale, Ill. 60691

Continuation of Ser. No. 803,249, Dec. 2, 1985, abandoned. This application Jan. 28, 1987, Ser. No. 7,577
Int. Cl.[4] B65H *3/32*
U.S. Cl. 271—10 **20 Claims**



1. In a conveyor for feeding stock items to associated mechanism,

means for storing said stock items in a stack,

means for feeding said items to the associated mechanism from said storing means including means for sequentially delivering to said mechanism said items one by one off the bottom of the stack during predetermined intervals, and

means intervening said intervals for lifting the entire stack off said feeding means and comprising means for thereupon facilitating pullout of the bottom item by said mechanism,

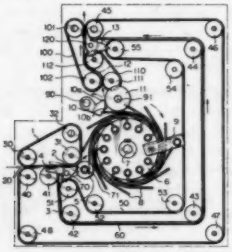
said means for feeding said items comprising rotatable means disposing beneath the stack and having slick areas and high frictional areas circumferentially offset from each other, said slick areas projecting farther from the axis of rotation of said rotatable means than said frictional areas and being operative to engage and lift the stack and provide a slide surface for the bottom item during said interval and said frictional areas operative to advance the succeeding bottom article a predetermined distance from under the stack into said mechanism after the previous bottom item has been completely withdrawn by said mechanism from under the stack by engaging such succeeding article attendant to the stack being lowered upon the respective frictional area.

4,715,594

FACE AND BACK REVERSING MECHANISM

Minoru Isobe; Yoshinori Koshida, and Katunori Yuasa, all of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Feb. 7, 1986, Ser. No. 827,352
Claims priority, application Japan, Feb. 13, 1985, 60-26073
Int. Cl.⁴ B65H *29/58*
U.S. Cl. 271—65 **8 Claims**



1. A document front face and back face reversing mechanism, comprising:

moving means for continuously moving a succession of documents having front faces and back faces inserted at a entry position, forward end first, thereinto in succession, along a first conveyance path, all of the documents inserted into the moving means having a same one of the front face and the back face facing in a same direction at said entry position, said moving means including a plurality of continuously moving document holder parts for holding respective ones of the succession documents from said entry position to an extraction position;

stopper means at said extraction position, for successively receiving and stopping only the successive documents at said extraction position;

extracting and conveying means for successively extracting the successive documents from said holder parts, rearward ends first, and conveying the successive documents rearward ends first toward a merge position with the other one of the front faces and back faces of the successive documents facing in a given direction; and

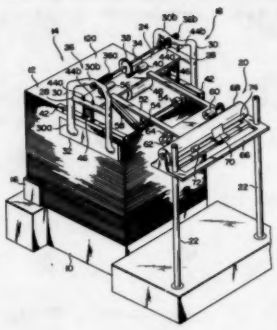
bypassing and conveying means for conveying other documents having the other of the front faces and back faces thereof facing in said same direction upstream of said entry position, along a second conveyance path bypassing said entry position and said moving means, to said merge position with the other one of the front faces and back faces thereof facing in said given direction.

4,715,595

APPARATUS FOR FEEDING PAPER SHEETS FROM A PAPER STOCK TO A PRINTER OR READER

Toshinori Ishigaki, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 30, 1985, Ser. No. 814,759
Claims priority, application Japan, Dec. 28, 1984, 59-276221
Int. Cl.⁴ B65H *7/14, 3/06*
U.S. Cl. 271—110 **12 Claims**



10. A printer comprising:

a base on which a rectangular, parallelepiped stack of a number of sheets is placed;

a printer main body; and

a paper feeder for sequentially feeding the sheets from the uppermost sheet to said printer main body, said paper feeder including:

a paper feeder main body arranged above the sheet stack;

a feed roller, supported by said paper feeder main body and in contact with the uppermost sheet, for feeding the uppermost sheet in a predetermined direction;

drive means for driving said feed roller to advance the uppermost sheet in the predetermined direction;

regulating means, arranged at a predetermined position with respect to the uppermost sheet, for allowing movement of the uppermost sheet and preventing movement of the other sheets; and

support means, movable in accordance with a change in the height of the sheet stack upon sheet feed, for supporting said paper feeder main body and said regulating means spaced above the uppermost sheet at times when the feed roller feeds the uppermost sheet, said printer main body being interconnected with said paper feeder for vertical movement therewith, wherein said printer main body and said paper feeder move vertically downward together as sheets are fed from the top of the sheet stack by said paper feeder.

4,715,596

PAPERBOARD SHEET FEEDER

Larry K. Cantrell, Spartanburg, and Edwin J. Smith, Duncan, both of S.C., assignors to Grant Machinery Inc., Inman, S.C.

Filed Apr. 23, 1986, Ser. No. 855,117
Int. Cl.⁴ B65H *3/06*
U.S. Cl. 271—116 **20 Claims**

1. A paperboard sheet feeder, comprising:

a support for a stack of paperboard sheets;

a roller on said support;

bearing means engaging said roller for rotatably supporting said roller on said support;

drive means for rotating said roller, said drive means including:

a drive gear;

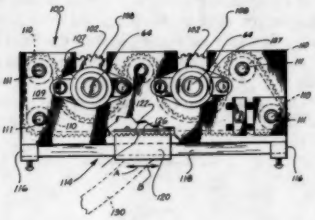
clutch means connecting said drive gear to said roller for rotating said roller when said drive gear is rotated in one

direction and for allowing said roller to freewheel when said drive gear is rotated in an opposite direction;

a drive belt having a surface engaging said drive gear;

a guide; and

a slide block slidably mounted on said guide, said drive belt being connected to said block so that said drive gear is



driven in said one direction and then in said opposite direction as said slide block reciprocates on said guide and said roller is driven in a positive manner when said drive gear is rotated in said one direction and said roller freewheels when said drive gear is driven in said opposite direction.

4,715,597

AUTOMATIC DOCUMENT FEEDER

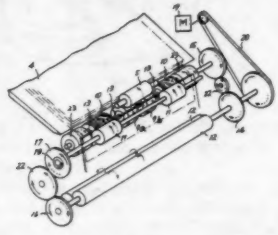
Yasuo Sakurai, Atsugi, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Mar. 19, 1986, Ser. No. 841,182

Claims priority, application Japan, Mar. 19, 1985, 60-53303; Apr. 1, 1985, 60-66587

Int. Cl.[4] B65H *3/52*

U.S. Cl. 271—122 **8 Claims**



1. An automatic document feeder comprising:

a separating roller rotatably supported at one end of a table for placing thereon a stack of sheets of documents to be fed;

a friction roller rotatably supported and pressed against said separating roller;

a feed roller rotatably supported and coaxial with said separating roller;

a transport roller rotatably supported and pressed against said feed roller;

driving means for driving to rotate said separating, feed and transport rollers selectively depending on a direction of rotation; and

wherein said separating roller is comprised of a material different from that of said feed roller.

4,715,598

BASKETBALL GAME AND COURT

John K. Knight, Doncaster, Australia, assignor to R.F.D. Consultants Pty. Ltd., Melbourne, Australia

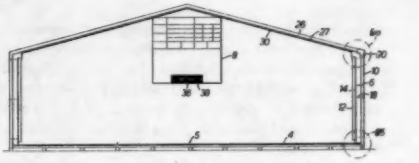
PCT No. PCT/AU84/00267, § 371 Date Sep. 3, 1985, § 102(e) Date Sep. 3, 1985, PCT Pub. No. WO85/03009, PCT Pub. Date Jul. 18, 1985

PCT Filed Dec. 21, 1984, Ser. No. 776,117

Claims priority, application Australia, Jan. 13, 1984, PG3181

Int. Cl.[4] A63B *71/02, 63/08;* A63C *19/00;* E04H *3/14*

U.S. Cl. 272—3 **18 Claims**



1. A court for a ball game comprising a substantially planar floor surface, a wall portion which at least in part comprises a barrier and a goal arranged so that the barrier forms at least part of the boundary of the area of playing the game and when struck allows for rebounding of the ball into play, and a goal structure located generally centrally of said floor surface and above the floor surface to enable unimpeded access beneath the goal structure, and wherein the goal structure includes a fixed rigid back board rebound and first and second goal targets located on opposite sides of the barrier.

4,715,599

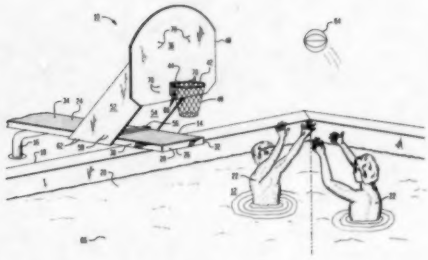
BASKETBALL BACKBOARD FOR A DIVING BOARD

Dean Raymond, 124 Manlove Ave., Hightstown, N.J. 08520, and John J. Metrosky, R.D. 1, Box 111, Allentown, N.J. 08501

Filed Jun. 13, 1986, Ser. No. 873,997

Int. Cl.[4] A63B *63/08*

U.S. Cl. 273—15 R **4 Claims**



1. A method for connecting a game apparatus to a diving board, said game apparatus including a basketball-like backboard, a first and second panel connected to said backboard, and an upper and a lower horizontal member connected to said first and second panels respectively, said method comprising the steps of:

placing the end of said diving board between said first and second horizontal members;

resting the weight of said apparatus on said first horizontal member on said diving board; and,

rotating said apparatus so that said second horizontal member contacts the underside of said diving board,

wherein said apparatus is held in place by the downward action of the force of gravity tending to cause said apparatus to tilt forward and said second horizontal member to

stay in contact with the bottom surface of said diving board.

4. A water game apparatus for use in a swimming pool having a diving board, said diving board having a top surface, a bottom surface, a first vertical edge and a second vertical edge, said water game apparatus comprising:

a target including a relatively flat basketball-like backboard and a hoop means attached to said basketball-like backboard;

first horizontal means locatable on the top surface of said diving board for supporting the bulk of the weight of said apparatus;

second horizontal means for keeping said apparatus from tipping over, said second horizontal means being locatable up against the bottom surface of said diving board;

first vertical means attached to said first horizontal means, said second horizontal means and said basketball-like backboard and locatable along said first vertical edge of said diving board; and,

second vertical means also attached to said first horizontal means, said second horizontal means and said basketball-like backboard and locatable along said second vertical edge of said diving board opposite from said first vertical edge of said diving board,

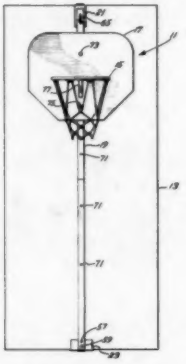
wherein the center of gravity of said apparatus is located forward of said first horizontal means in the direction of said basketball-like backboard when said apparatus is properly attached to said diving board.

4,715,600

DOOR MOUNTED, HEIGHT ADJUSTABLE BASKETBALL BACKBOARD AND RIM

James C. Offutt, Peoria, Ill., assignor to Rimball, Inc., Peoria, Ill.

Filed Mar. 27, 1986, Ser. No. 844,986
Int. Cl.[4] A63B *63/08*
U.S. Cl. 273—1.5 R **3 Claims**



1. A basketball game apparatus comprising:

a first U-shaped bracket member having a U-shaped channel of a size for receiving the upper edge of a conventional door;

a second U-shaped bracket having a channel of a size for receiving the lower edge of the door;

a vertical pole of length shorter than the height of the door and having a first end and a second end, said first end being secured to said first bracket and said second end being secured to said second bracket for securing said pole in a substantially vertical relationship with respect to the outer face of the door;

tightening means for pulling said first and second bracket toward one another for clamping the door tightly therebetween in order to rigidly dispose said pole relative to the door; and

a backboard and basketball rim assembly adjustably mountable to various vertical positions along said pole;

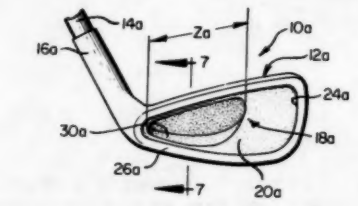
said first U-shaped member including a relatively thin L-shaped metal member and a relatively thick front member, said L-shaped member having a first leg for seating against the backside of the door and a second leg for seating against the top edge of the door, said thick front member having a first face for seating against the front face of the door and a second top face for abutting a portion of said second leg of said L-shaped member; and securement means for securing said second leg to said second top face of said front member.

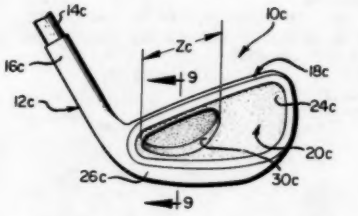
4,715,601

SET OF GOLF CLUBS AND METHOD OF MATCHING SAME

Anthony Lamanna, 24 N. 38 Valley Rd., Lake Zurich, Ill. 60047

Filed Feb. 25, 1986, Ser. No. 833,101
Int. Cl.[4] A63B *53/04*
U.S. Cl. 273—77 A **12 Claims**





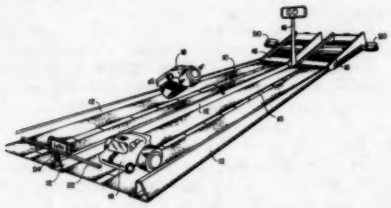
1. A set of golf clubs including at least a first and a second club, each club comprising a club head and a shaft, each club head including a hosel portion to which the shaft is attached and a blade portion, said blade portion including, a substantially planar face for striking a golf ball and a back portion opposite said planar face, the substantially planar faces on the respective club heads of the set being disposed at varying angles with respect to a vertical datum line to provide progressive degrees of loft, such that the planar face on the first of said club heads is disposed at a lesser angle to said datum line than is the planar face on the second one of said club heads in said set, the back portions of each said first and second club heads including a cavity formed therein, and the cavity in said first club head being of a larger volume than the cavity in said second club head, with the volume of the cavities in said clubs decreasing from the lower lofted clubs of said set to the higher lofted clubs, and the length of the hosel portion on said first club being shorter than the hosel portion on said second club with the hosel length on said clubs increasing from the lower lofted clubs to the higher lofted clubs of said set, such that the hosel length may be selected to provide a relatively uniformly located center of mass for each club head in the set.

4,715,602

RACING GAME APPARATUS

Richard L. May, 326 S. Pacific Coast Hwy., Redonda Beach, Calif. 90277; Jay Smith, Los Angeles, and Harley Wolf, Studio City, both of Calif., assignors to Richard L. May and Kenath Curran, both of Redondo Beach, Calif.

Filed May 9, 1986, Ser. No. 861,356
Int. Cl.[4] A63F 9/14
U.S. Cl. 273—86 R 6 Claims



1. Racing game apparatus including: a track comprising a running surface and a pair of upright side members extending along the respective edges thereof; an inertia type motor vehicle to be propelled along the running surface of the track between the side members after its wheels are first set in a spinning condition; a ramp attached to one end of said track including a trap door for receiving the spinning wheels of the vehicle; a manually operated mechanism attached to said trap door for closing said trap door to release the vehicle from the ramp; a starting flag assembly attached to said ramp including a pivoted arm, a latch for holding the arm in an essentially horizontal position, resilient means coupled to the arm for biasing the arm to an upright position when released by the latch; and a manually operated release mechanism coupled to the latch, said release mechanism including a dual operated button assembly which responds only to the simultaneous operation by two persons to operate said release mechanism.

4,715,603

MINIATURE SIMULATED BASEBALL

Lawrence C. Gleason, 2036 Canyon #34A, Boulder, Colo. 80302

Continuation of Ser. No. 740,954, Jun. 3, 1985, abandoned. This application Sep. 11, 1986, Ser. No. 906,229
Int. Cl.[4] A63F 7/20
U.S. Cl. 273—90 19 Claims

1. The baseball game with a lighting system to simulate an actual night baseball game said lighting system comprising:

(1) a slotted base member with said slot having a width wide enough to fit snugly on top of a boarder wall;

(2) a shaft whereby said base member is connected to a backplate; and

(3) a plurality of miniature lamps set in said backplate; and

(4) a screen connected to said backplate encasing said lamps whereby said lamps are protected from damage by a ball batted.

2. A miniature simulated baseball game using a miniature simulated baseball, a plurality of simulated baserunners, and a plurality of simulated miniature defensive fielders which comprises:

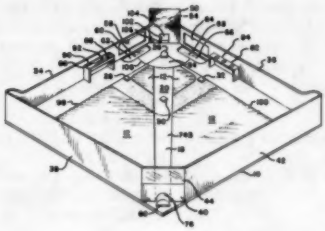
(A) a component playing surface simulating quite closely an actual baseball playing field, including a home plate, an infield diamond, and an outfield;

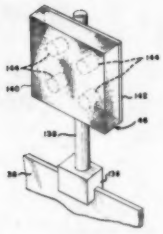
(B) an adjustable simulated strike zone comprising;

(1) a backstop located behind home plate, said backstop having an adjustable opening; and

(2) a barrier means for adjusting the size of said adjustable opening to thereby define said strike zone;

(C) a means to pitch a simulated miniature baseball, said baseball pitching means spaced from said simulated home plate and including a soft flexible material of a thickness easily depressed by a finger tip; and





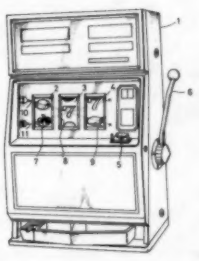
(D) a right and a left battersbox, said battersboxes being adjacent said home plate and including means for resting a hand therein.

4,715,604

SLOT MACHINE

Kazuo Okada, Tokyo, Japan, assignor to Kabushiki Kaisha Universal, Tochigi, Japan

Filed Apr. 24, 1986, Ser. No. 855,414
Claims priority, application Japan, Apr. 30, 1985, 60-63157[U]
Int. Cl.[4] A63F 5/04
U.S. Cl. 273—143 R 5 Claims



1. A slot machine in which combinations of symbols are selected on predetermined prize-winning lines in the play of a game, said slot machine comprising:

a plurality of lengthwise movable symbol rows arranged side by side, each said symbol row having various symbols arranged lengthwise at a regular spacing;

means for allowing at least one complete symbol of each said symbol row to be displayed therein;

means for causing said symbol rows to move lengthwise;

means for stopping said symbol rows to position all said symbols of said symbol rows that are adjacent to each

other relatively shifted lengthwise of the rows by a half of said spacing; and

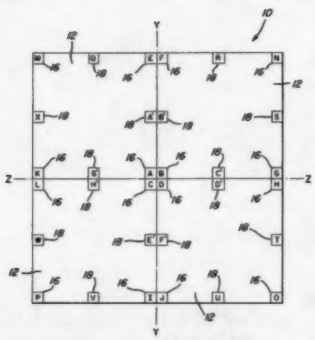
means for paying out a predetermined number of coins when a prize-winning combination of said displayed complete symbols is displayed on at least one predetermined prize-winning line extending diagonally to said lengthwise arrangement of symbols.

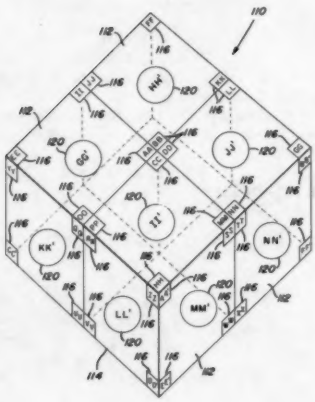
4,715,605

TWO AND THREE-DIMENSIONAL NUMBER GAME OR PUZZLE

Steven F. Fritzman, 38 Mourning Dove Dr., Stafford, Va. 22554

Filed Feb. 12, 1986, Ser. No. 828,478
Int. Cl.[4] A63F 9/06, 9/20
U.S. Cl. 273—156 **14 Claims**





1. A game or puzzle, comprising

at least four, two-dimensional card game pieces, wherein each one of said two-dimensional card game pieces has the configuration of a square, interchangeably disposable at predetermined locations with respect to each other, and orientable in any one of a plurality of different orientations at each one of said predetermined locations, so as to form at least an interrelated two-by-two array of said card game pieces which also has the configuration of a square;

dissimilar indicia disposed at each corner of each of said square-shaped card game pieces, as well as about the peripheral edge portions of each of said square-shaped card game pieces substantially centrally between said corners of each of said square-shaped card game pieces, so as to define a pattern of indicia upon each one of said card game pieces which is identical upon each one of said card game pieces whereby said orientations and interchangeability of said card game pieces is facilitated;

a first set of said indicia upon all of said card game pieces located at the center of said two-by-two array of said card game pieces as defined by the mating corners of each of said at least four square-shaped card game pieces;

a second set of said indicia upon all of said card game pieces located at the center of each peripheral edge portion of said two-by-two array of said card game pieces as defined by adjacent mating corners of adjacent pairs of said square-shaped card game pieces; and

a third set of said indicia upon all of said card game pieces located between said first and second sets of said indicia along the mating edges of said adjacent pairs of said card game pieces as defined by said indicia located at said central peripheral edge portions of each one of said square-shaped card game pieces,

said first, second, and third sets of indicia being related to each other when said card game pieces are disposed at correct ones of said locations, and in correct ones of said orientations, within said two-by-two array of said card game pieces so as to satisfy at least one of the relationships wherein: (1) all of said indicia of at least one of said second and third sets of said indicia is the same as or equal to all of said indicia of the same set of indicia of said second and third sets of indicia disposed respectively along each of said mating edges of said adjacent pairs of said card game pieces, or (2) all of said indicia of one of said second and third sets of indicia is the same as or equal to all of said indicia of the other one of said second and third sets of indicia disposed respectively along each of said mating edges of said adjacent pairs of said card game pieces, or (3) at least one of said entire sets of indicia is the same as or equal to at least one other one of said entire sets of indicia.

2. A game or puzzle, comprising:

at least four, three-dimensional game pieces, wherein each one of said three-dimensional game pieces has the configuration of a cube, interchangeably disposable at predetermined locations with respect to each other, and orientable in any one of a plurality of different orientations at each one of said predetermined locations, so as to form at least an interrelated two-by-two-by-one array of said cubical game pieces which has the configuration of a prallelepiped as defined by upper and lower horizontal planar surfaces which are at least two cube game pieces wide and two cube game pieces long, and vertical side planar surfaces which are one cube game piece deep;

dissimilar indicia disposed at each corner of each planar surface of each one of said cubical game pieces, as well as at the center of each of said planar surfaces of said each one of said cubical game pieces, so as to define a pattern of indicia upon said each one of said planar surfaces which is identical upon each one of said planar surfaces of said cubical gate pieces whereby said orientations and interchangeability of said cubical game pieces is facilitated;

a first set of said indicia upon all of said planar surfaces of all of said cubical game pieces located at the center of each one of said planar surfaces of said each one of said cubical game pieces;

a second set of said indicia upon all of said planar surfaces of all of said cubical game pieces located at the center of each peripheral edge portion of said upper and lower horizontal planar surfaces of said array of said cubical game pieces as defined by adjacent mating corners of adjacent mating pairs of said cubical game pieces;

a third set of said indicia upon all of said planar surfaces of all of said cubical game pieces located at the center of each upper edge portion of each vertical side planar surface of said array of said cubical game pieces as defined by adjacent mating corners of adjacent mating pairs of said cubical game pieces; and

a fourth set of said indicia upon all of said planar surfaces of all of said cubical game pieces located at the center of each lower edge portion of each vertical side planar surface of

said array of cubical game pieces as defined by adjacent mating corners of adjacent mating pairs of said cubical game pieces,

said first, second, third, and fourth sets of said indicia being related to each other when said cubical game pieces are disposed at correct ones of said locations, and in correct ones of said orientations, within said two-by-two-by-one array of said cubical game pieces so as to satisfy at least one of the relationships wherein: (1) all of said indicia of said first set of said indicia, and located upon any one vertical side planar surface of said array of cubical game pieces, is the same as or equal to all of said indicia of said first set of said indicia located upon all of the remaining vertical side planar surfaces of said array of cubical game pieces, or (2) the indicia of said first set of said indicia, and located upon each planar surface of each of said cubical game pieces disposed within each of said vertical side planar surfaces of said array of cubical game pieces, is the same as or equal to the indicia of said first set of said indicia located upon the same vertical side planar surface of said array of cubical game pieces, or (3) all of the indicia of any one of said second, and third and fourth, sets of indicia, respectively located at any one of said edge locations upon said upper and lower horizontal planar surfaces, and said vertical side surfaces, of said array of cubical game pieces, is the same as or equal to all of the indicia of the same set of indicia located at the remaining ones of said edge locations upon said upper and lower horizontal planar surfaces, and said vertical side surfaces, of said array of said cubical game pieces, or (4) the indicia of any one of said second, and third and fourth, sets of indicia, respectively located at any one of said edge locations upon said upper and lower horizontal planar surfaces, and said verticle side surfaces, of said array of said cubical game pieces, is the same mas or equal to the indicia of the same set of indicia located at the same edge location, as defined by the adjacent indicia of adjacent mating corners of adjacent mating pairs of said cubical game pieces, while the remaining indicia of said other ones of said second, and third and fourth, sets of indicia, respectively located at the remaining ones of said edge locations upon said upper and lower horizontal planar surfaces, and said vertical side planar surfaces, of said array of said cubical game pieces, are the same as or equal to the indicia of the same sets of indicia, respectively located at the same edge locations corresponding to said remaining indicia respectively located at said remaining ones of said edge locations upon said upper and lower horizontal planar surfaces, and said vertical side planar surfaces, of said array of cubical game pieces.

4,715,606

GOLF CLUB WITH HEAD WEIGHT CONTROL DEVICE

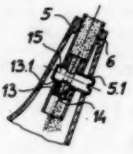
Alan Varley, Kowitzberg 41, 2407 Lübeck-Travemünde, Fed. Rep. of Germany

Filed Nov. 29, 1985, Ser. No. 803,121

Claims priority, application Fed. Rep. of Germany, Dec. 3, 1984, 3444072

Int. Cl.[4] A63B *69/36*

U.S. Cl. 273—194 B **5 Claims**



1. A golf club comprising:

a head;

a hollow space within said head;

a shaft holder having a bore therein communicating with said hollow space;

a hollow shaft having an inner end affixed to said shaft holder;

means for permitting addition of a flowable filling material into said shaft; and

control means adjacent said inner end of said shaft, adjustable from outside said golf club for controlling a free flow of said flowable filling material between said hollow shaft and said hollow space, whereby a weight distribution of said golf club is adjusted.

4,715,607

GOLF BALL COMPOSITION

Francisco M. Llort, Dighton; Paul M. Gendreau, Swansea, both of Mass., and Raymond A. Berard, Portsmouth, R.I., assignors to Acushnet Company, New Bedford, Mass.

Filed Feb. 18, 1986, Ser. No. 830,695

Int. Cl.[4] A63B *37/00, 37/02, 37/06*

U.S. Cl. 273—218 **16 Claims**

6. A golf ball product formed from a mixture comprising polybutadiene having a cis-1,4-polybutadiene content of above about 40% and, per 100 parts polybutadiene, from about 30 to about 40 parts zinc diacrylate, and from about 0.1 to about 1.0 parts free radical initiator, and further comprising from about 0.01% to 2.0% zinc dimethacrylate by weight of the combined weight of the zinc diacrylate and zinc dimethacrylate.

4,715,608

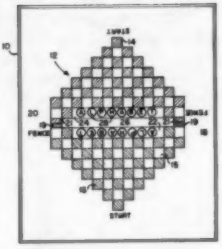
EDUCATIONAL GAME APPARATUS

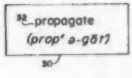
Johanna Burt, 2125 Palm Vista Dr., Apopka, Fla. 32703

Filed Nov. 24, 1986, Ser. No. 934,499

Int. Cl.[4] A63F *3/00*

U.S. Cl. 273—248 **6 Claims**





1. Educational board game apparatus comprising:

(a) a board having a playing field, said field having

(i) a first essentially pyramidal design formed by a first checkerboard pattern having alternating first dark and light squares, a vertex thereof adjacent a first playing end of said board and a first base toward a second playing end of said board;

(ii) a second essentially pyramidal design formed by a second checkerboard pattern having alternating second dark and light squares, said second dark squares differing distinguishably from said first dark squares, a vertex thereof adjacent said second playing end of said board and a second base contiguous with said first base;

(iii) a first word ALPHABET having each letter of a size to fit into a square of said designs, said word disposed in a line within said first design, parallel to said first base,

and oriented to be read from said second playing end, said word including means for associating the letters thereof with said second dark squares;

(iv) a second word ALPHABET having each letter of a size to fit into a square of said designs, said word disposed in a line within said second design, parallel with said second base, and oriented to be read from said first playing end, said word including means for associating the letters thereof with said first dark squares;

(b) a set of game word cards having a word printed on one side thereof and a definition of such word printed on the other side thereof, one of said cards being drawn by a player prior to each play of said game for providing a word to such player for spelling or definition prior to such play;

(c) a set of movable playing pieces including

(i) a plurality of blank playing tiles having a size to fit within said squares for moving in increments over said playing field,

(ii) a plurality of indicator tiles having the letter M on one face thereof and the letter S on an opposite face thereof for a player during play of said game to place on said board to indicate "spelling" or "meaning"

(iii) a plurality of alphabet tiles each alphabet tile having a letter thereon and being of a size to cover a letter of said word ALPHABET, said alphabet tiles having collectively at least twice the number of letters required to spell the word ALPHABET, said alphabet tiles serving to cover a corresponding letter of the word ALPHABET when a player's playing tile is moved thereon during play of said game; and

(d) chance means for operation by a player to determine the number of increments of movement of a playing tile over said playing field when such player successfully spells or defines a word on one of said word cards drawn from said set.

4,715,609

SEAL ELEMENT FOR SEALING DUCTS OF AN AIR CONDITIONER SYSTEM

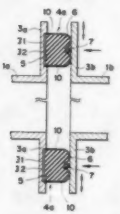
Kaoru Mino; Koji Fukushima, and Takashi Kasai, all of Konan, Japan, assignors to Diesel Kiki Co., Ltd., Tokyo, Japan

Filed Dec. 3, 1985, Ser. No. 804,256

Claims priority, application Japan, Dec. 7, 1984, 59-185758[U]; Dec. 10, 1984, 59-259267

Int. Cl.[4] F16J *15/10*

U.S. Cl. 277—207 R **3 Claims**



1. A seal element for providing a seal by being squeezed between opposed surfaces of a pair of joint members comprising:

an elongate elastic body of an elastic material and having a pair of side surfaces sealingly engageable respectively with the surface of the joining members, one of said side surfaces having an outwardly bowed configuration, said elastic body having along its entire length an elongated sealing fin projecting integrally from said bowed one side surface;

said sealing fin having less elasticity than said body;

said body having a semi-elliptical cross-sectional shape defined by said one and other side surfaces, said other side surface including the minor axis of an ellipse containing said semi-elliptical crosssectional shape, said sealing fin extending perpendicular to said other surface; and

whereby when said seal element is squeezed between the opposed surfaces of the joint members, said elastic body being elastically deformable in such a manner that said one bowed side surface is urged by said sealing fin to flex inwardly toward the other side surface and is held in sealing engagement with one of the opposed surfaces of the joint members.

4,715,610

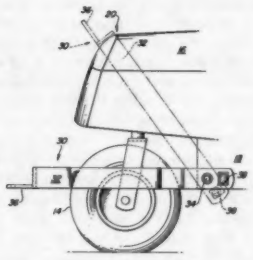
HITCH FOR A VEHICLE HAVING A SINGLE REAR WHEEL

James N. Wisdom, Beaver Dam, Wis., assignor to Deere & Company, Moline, Ill.

Filed May 13, 1986, Ser. No. 862,857

Int. Cl.[4] B60D *1/00*

U.S. Cl. 280—490 R **4 Claims**



1. In a hitch on a vehicle having a single rear wheel, said vehicle including a frame extending outwardly from both sides of said rear wheel and a rear body section having side portions, a rear portion, and a top portion including a contoured upper rear section; said rear body section being supported on said frame and extending vertically above said rear wheel, the improvement comprising:

a generally C-shaped support having opposite ends pivotally attached to said frame on opposite sides of said rear wheel, said support being attached forwardly of said rear wheel and being selectively movable between a lowered towing position and a raised stored position wherein said support encircles said side portions and said rear portion adjacent said contoured upper rear section of said rear body section above said rear wheel;

a hitch plate attached to and extending out from the central portion of said support; and

means for selectively locking said support against pivotal movement in said towing and stored positions.

4,715,611

MOUNTING OF THE COUPLING BODY OF A TRAILER COUPLING IN THE CROSS-PIECE

Johann Breu, Munich, Fed. Rep. of Germany, assignor to Rockinger Spezialfabrik für Anhängerkupplungen GmbH & Co., Munich, Fed. Rep. of Germany

Filed Aug. 14, 1986, Ser. No. 896,889

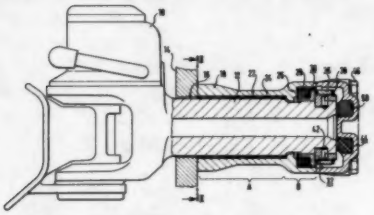
Claims priority, application Fed. Rep. of Germany, Aug. 27, 1985, 3530565

Int. Cl.[4] B60D *1/00*

U.S. Cl. 280—504 **15 Claims**

1. A trailer coupling for a towing vehicle having a coupling body, a draw rod issuing from the coupling body, a cross-piece for attachment to the towing vehicle, a bearing tube secured to the cross-piece and having a passage therein concentric with the bore of the cross-piece, said draw rod passing through a

bore in the cross-piece and being guided in said passage, said draw rod being axially supported on the bearing tube against traction force and thrust force transmission, the cross-section of the draw rod occupying substantially the full cross-section

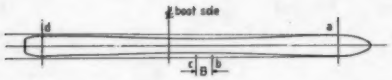


of the cross-piece bore, and the bearing tube, commencing on the side of the cross-piece remote from the coupling body, extending exclusively in the direction of the coupling body, wherein the draw rod is supported in both force directions on an end section of the bearing tube remote from the cross-piece.

4,715,612
ALPINE SKI

Christopher Fels, 32-655 Richmond Road, Ottawa, Ontario K2A 3Y3, Canada, and David Fels, 317 Chapel Street, Ottawa, Ontario K1N 7Z2, Canada

Filed Dec. 4, 1985, Ser. No. 804,836
Claims priority, application Canada, Jun. 28, 1985, 485027
Int. Cl.[4] A63C 5/04
U.S. Cl. 280—609 **8 Claims**



1. A snow ski having a bottom camber, a side camber, and a single waist, said waist defined as that portion of the ski at which the side camber defines the minimum width of the ski, said ski comprising an overall length of 140 cm. to 230 cm., and wherein the maximum height of the bottom camber is in the rearward portion of the ski behind the centerline of the boot placement and the waist of the ski is wholly ahead of the centerline of boot placement such that the ski width is increasing in the rearward direction of the ski at this centerline position.

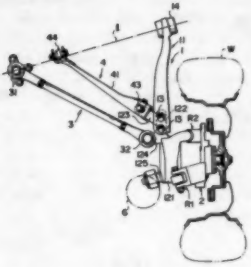
4,715,613
Patent Not Issued For This Number

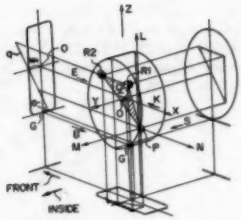
4,715,614
VEHICLE REAR-SUSPENSION SYSTEM

Takao Kijima, and Fumitaka Ando, both of Hiroshima, Japan, assignors to Mazda Motor Corporation, Japan

Filed Jul. 17, 1984, Ser. No. 631,791
Claims priority, application Japan, Jul. 27, 1983, 58-138530
Int. Cl.[4] B60G 3/26, 7/02
U.S. Cl. 280—701 **12 Claims**

1. A wheel suspension of a rear wheel of a vehicle, comprising a wheel supporting member having a trailing arm and a first control link, wherein said trailing arm at its end directed to a vehicle body is vertically pivotable about a pivotal axis, the trailing arm being connected to the vehicle body by means of a resilient bushing, and wherein the first control link at its end directed to the vehicle body is pivotably connected to one end of a second control link, said second control link, at its other end, being pivoted to the vehicle body at a body side pivotal center whereby the body side pivotal center of the second control link is downwardly offset from the pivotal axis of the trailing arm, a ball joint connecting the wheel supporting member to the trailing arm so as to permit pivotable movement of the wheel supporting member about a point relative to the trailing arm, and first and second resilient bushings which resiliently connect the wheel supporting member to the trailing



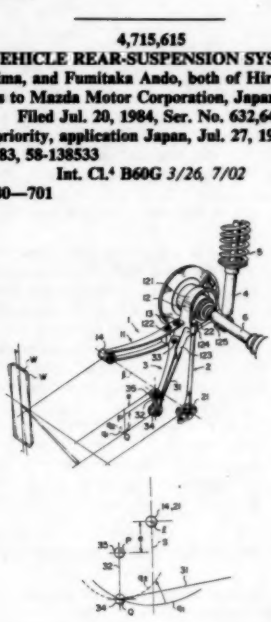


arm, the ball joint and the first and second resilient bushings being arranged to cause the rear wheel to toe in against a force acting thereon.

4,715,615
VEHICLE REAR-SUSPENSION SYSTEM

Takao Kijima, and Fumitaka Ando, both of Hiroshima, Japan, assignors to Mazda Motor Corporation, Japan

Filed Jul. 20, 1984, Ser. No. 632,648
Claims priority, application Japan, Jul. 27, 1983, 58-138528; Jul. 27, 1983, 58-138533
Int. Cl.[4] B60G 3/26, 7/02
U.S. Cl. 280—701 **11 Claims**



1. A wheel-suspension of a rear wheel of a vehicle comprising a wheel supporting member having a trailing arm and a first control link, wherein said trailing arm at its end directed to the vehicle body is vertically pivotable, being connected to the

vehicle body at a body side mounting point by means of a resilient bushing and wherein said first control link at its end directed to said vehicle body is pivotably connected with one end of a second control link, said second control link, at its other end, being pivoted to said vehicle body at a body side pivot center (P), a lateral link, one end of which is pivotably connected to the wheel supporting member and the other end of which is pivotably connected to said vehicle body at a body side mounting point, respectively, whereby the body side pivotal center (P) of said second control link is downwardly offset from the line (l) adjoining the body side mounting point of said trailing arm and the body side mounting point of said lateral link by a predetermined amount (e), said lateral link being connected by means of ball joints to said wheel supporting member and said vehicle body.

4,715,616

REAR SUSPENSION CONTROLLER

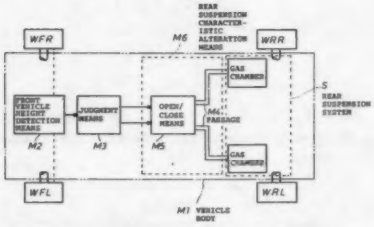
Ken Asami, Nagoya; Kaoru Ohashi, Okazaki; Toshio Onuma, Susono, and Shuuichi Buma, Toyota, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan

Filed Dec. 23, 1985, Ser. No. 812,351

Claims priority, application Japan, Dec. 25, 1984, 59-276513; Dec. 27, 1984, 59-275824

Int. Cl.[4] B60G *11/26*

U.S. Cl. 280—707 **9 Claims**



1. A rear suspension controller for a vehicle including suspensions having gas chambers for gas springs and provided for the right and left rear wheels of the vehicle, comprising:

a front vehicle height detection means for detecting a distance between a front wheel and the body of the vehicle and for generating a front vehicle height signal corresponding to a substantially instantaneous value of said distance;

a judgment means for comparing a absolute value of said front vehicle height signal with a predetermined reference signal and for generating a judgment result signal when the absolute value of the front vehicle height signal is greater than the predetermined reference signal;

passages for connecting the gas chambers of the right and the left rear gas suspensions to each other;

and open/close means for opening or closing said passages; and

a rear suspension characteristic alteration means for performing control to open the open/close means for the passages substantially simultaneous with the generating of the judgment result signal.

4,715,617

PASSENGER COMPARTMENT SENSOR WITH LOW BIAS

David Breed, Boonton Township, Morris County, N.J., assignor to Breed Corporation

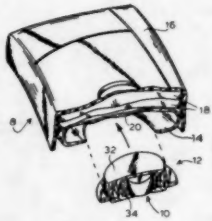
Continuation of Ser. No. 580,338, Feb. 15, 1984, abandoned. This application Apr. 24, 1987, Ser. No. 48,515

Int. Cl.[4] B60R *21/08*

U.S. Cl. 280—731 **16 Claims**

1. A sensor with a low-bias for mounting outside of the vehicle crush zone and operable without electrical power for actuating a pyrotechnic device, said sensor comprising:

a movable sensing mass, a rotatable shaft, a sensing train which includes means for translating movement of the sensing mass rotation of the shaft, a primer, a spring biased



firing pin operatively connected to the shaft for maintenance in a retracted position, relatively low g biasing means acting on the sensing mass, means requiring the sensing mass to move a predetermined distance before the shaft rotates sufficiently to permit the firing pin to be released to strike a primer.

4,715,618

VEHICLE SAFETY HARNESS FOR PETS

Garry L. Harris, 5250 S. Hardy Dr., Tempe, Ariz. 85283

Filed Dec. 4, 1986, Ser. No. 937,700

Int. Cl.[4] B60R *22/00*

U.S. Cl. 280—801 **15 Claims**

1. A safety harness for restraining a pet in a predetermined location in an automotive vehicle having a rigid frame, said safety harness comprising:

a jacket configured as an inverted vest having an essentially closed bottom portion for substantially enclosing the chest and forequarters of said pet, and an essentially open top portion;

belt means extending across said essentially open top portion of said jacket for securing said jacket about said pet; and

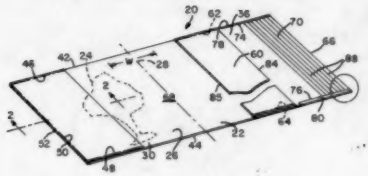
strap means for securing said jacket to the rigid frame of said vehicle, said strap means including a first strap having a first end a second end, first latch means for releasably attaching said first end of said first strap to the left side of said jacket, first anchoring means for releasably connecting said second end of said first strap to a portion of the rigid frame of said vehicle to the left of said predetermined location, a second strap having a first end and a second end, second latch means for releasably attaching said first end of said second strap to the right side of said jacket, and second anchoring means for releasably connecting the second end of said second strap to a portion of the rigid frame of said vehicle to the right of said predetermined location.

4,715,619

BOOK JACKET

Alexander Sloot, Stamford, Conn., assignor to Printmark, Inc., Stamford, Conn.

Filed Jan. 13, 1986, Ser. No. 818,553
Int. Cl.[4] B42D 3/04
U.S. Cl. 281—19 R 4 Claims



1. A jacket for a book having front and back outer covers of known dimensions and that are attached to each other along a spine whose thickness may vary depending upon the number of pages in the book, comprising:

an outer, thin, flexible, foldable continuous plastic sheet having first and second book-covering segments and further having top and bottom edges that are separated from each other by a distance that is generally commensurate with the height of a book to be covered, the length of said outer flexible sheet being sufficient so that said first and second outer book-covering segments are separated from each other by a floating uninterrupted flexible spine region whose width is sufficient to wrap around spines of different thicknesses within a range, the width of the floating spine region being greater than about two percent and generally less than about 20 percent of the overall length of the book jacket;

an inner, thin, flexible foldable plastic sheet affixed to the outer sheet and having at least first and second book cover engaging segments, said latter sheet segments being affixed to the outer sheet opposite the book-covering segments thereof to enable the front and back book covers to fit between the outer sheet and said first and second book cover engaging segments of said inner sheet, said latter segments further being affixed to the outer sheet at locations that are so spaced from each other so as to enable engagement with and retention of the front and back book covers regardless of the thickness, within a thickness range, of the spine of the book to be covered;

the inner sheet being further formed of separate individual first and second sheets, the first of said latter sheets being affixed to the outer sheet at one end thereof as well as near said top and bottom edges to form a pocket shaped to snugly receive the front outer cover of the book and enable predetermined alignment of a display thereon with respect to said outer sheet, the second of said separate individual sheets being affixed to the outer sheet at a location selected to maintain said engagement with and retention by the back outer cover of the book substantially independent of the thickness of the spine of the book to be covered.

4,715,620

MANIFOLD FORM ASSEMBLY

Gary J. Thompson, 2610 Brookdale, Green Bay, Wis. 54305

Filed Oct. 22, 1986, Ser. No. 921,964
Int. Cl.[4] B41L 1/00, 1/20; B41M 5/10
U.S. Cl. 282—9 R 14 Claims

1. An integral manifold form assembly for providing a plurality of completed two-page documents, comprising:

an original front page having at least one image-receiving area disposed thereon;

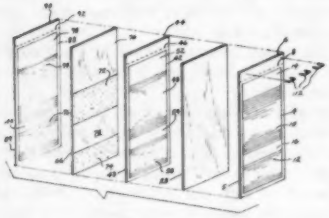
an original back page having at least one image-receiving area disposed thereon, said back page image-receiving area being non-overlapping with said front page image-receiving area when said front and back pages are aligned;

pressure sensitive image-transferring means integral with the form assembly for transferring pressure-created images formed on said image-receiving areas of said original front page and said original back page;

a duplicate of said front page integral with the form assembly and having at least one image-receiving area disposed thereon corresponding substantially to said original front page image-receiving area

a duplicate of said back page integral with the form assembly and having at least one image-receiving area disposed thereon corresponding substantially to said original back page image-receiving area; and

binder means for binding said original front and back pages, said image-transferring means, and said duplicate front



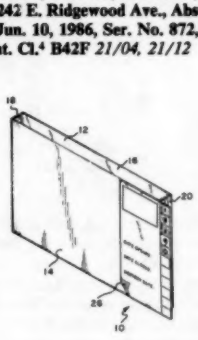
and back pages into an integral form assembly, said assembly being adapted for movement between a first position in which said original front page is exposed for completion, and a second position in which said original back page is exposed for completion, so that pressure-created images formed on said original front page image-receiving area when said assembly is in said first position are transferred to said duplicate front page image-receiving area by said image-transferring means, and pressure-created images formed on said original back page image-receiving area when said assembly is in said second position are transferred to said duplicate back page image-receiving area by said image transferring means, for providing a completed original front page and a completed original back page, and for providing a copy of said original front page on said duplicate front page and a copy of said original back page on said duplicate back page.

4,715,621

NUMERIC COLOR CODED FILING SYSTEM

William Colavito, R.D. 2, Box 450, Woodbine, N.J. 08270, and Christa Riggins, 242 E. Ridgewood Ave., Absecon, N.J. 08201

Filed Jun. 10, 1986, Ser. No. 872,547
Int. Cl.[4] B42F 21/04, 21/12
U.S. Cl. 283—36 6 Claims



1. A numeric color coded filing system for use with expandable files of known height and width comprising:

a substantially rectangularly shaped base member, said base member having a height which is substantially equal to the height of the face of the expandable files with which it is to be used and having a width which is less than the front length of said file but large enough to carry visually perceivable written indicia thereon, said base member being comprised of a substantially flexible sheet-like material and having an adhesive on the reverse side thereof;

the face of said base member along one vertical edge thereof having means dividing the same into a plurality of vertically arranged and substantially equal parts; when said base member is affixed to the front face of a file, said vertical edge is adapted to extend outwardly beyond the face of said file and to remain substantially vertical, the width of said vertical edge being substantially smaller than the width of the remaining portion of said base member;

said remaining portion of said base member having a surface which is adapted to be written upon and including a plurality of predesignated areas for the entry of data, some of said predesignated areas having preprinted indicia thereon and others of said areas being adapted to carry user entered indicia;

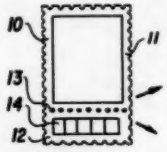
a plurality of labels, each of said labels being comprised of a sheet-like material and being substantially equal in size to each of said plurality of parts, each label having a numeric digit thereon and having a background color uniquely associated with said digit, each of the ten digits 0–9 being associated with a different background color, said labels having an adhesive on their reverse sides and being adapted to be affixed to said base member along said vertical edge.

4,715,622

POSTAL STAMP WITH PROVISIONS FOR ENTERING MACHINE READABLE DESTINATION IDENTIFIER

Ameer G. Mikhail, 2103 Windom Ct., Bel Air, Md. 21014

Filed Jan. 16, 1986, Ser. No. 819,298
Int. Cl.[4] B42D *15/00*
U.S. Cl. 283—71 **2 Claims**



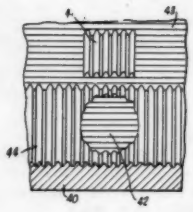
1. A postal stamp, comprising, a sheet of thin material having two surfaces, one of said surfaces being coated with a bonding material, a perforation formed along at least one direction within the outer boundaries of said stamp across said surfaces so that said stamp may be separated into at least two pieces, one of said pieces having designated spaces and indicia positioned thereon for entering a destination identifier code which may be written in numerals, alphabets, or their combinations thereof, with said destination identifier code being readable by a scanning device.

4,715,623

DOCUMENTS HAVING A REVEALABLE CONCEALED IDENTIFIER AND THE METHOD OF MAKING SUCH DOCUMENTS

Richard L. Roule, Westport, Conn., and Joshua C. Cantor, Westfield, N.J., assignors to American Bank Note Company, New York, N.Y.

Filed Sep. 28, 1984, Ser. No. 655,713
Int. Cl.[4] G09F *3/00, 19/16*
U.S. Cl. 283—91 **8 Claims**



1. Stock material for printing documents, said material having a revealable, at times concealed identifier, comprising:

a. a paper substrate having a nonspecular printable surface;

b. an intaglio idenitifier pattern impressed in said substrate surface without ink and defined by foreground areas surrounded by background areas having no color contrast with the foreground areas, said foreground areas having distinctive intaglio forms of ridges and grooves, said background areas having intaglio forms of ridges and grooves distinctively different from those of the adjacent foreground areas, said intaglio identifier pattern being visible only as a contrast in reflectivity of the foreground and background areas and only when observed along a line of sight that: (1) has an angle with the substrate surface which lies within a first limited range of angles; and (2) has an angle of orientation with respect to the ridges of the foreground areas which lies within a second limited range of angles.

4. The method of producing a revealable, at times concealed identifier pattern of variable appearance in a printable substrate, comprising the step of impressing an uninked intaglio plate against a nonspecular surface of the substrate, said plate carrying an intaglio identifier pattern including foreground areas surrounded by background areas, said foreground areas having distinctive intaglio forms of grooves in the surface of the plate, said background areas having intaglio forms of grooves distinctively different from those of the foreground areas, thereby producing in said substrate an identifier pattern of ridges and grooves, said pattern being invisible when observed along a line of sight normal to the substrate surface, but visible only as a contrast in reflectivity when observed along a different line of sight making a small acute angle with the substrate surface.

4,715,624

PLASTIC TO METAL TRANSITION FITTING

Henry A. Frye, 16112 Tortola Cir., Huntington Beach, Calif. 92649

Division of Ser. No. 747,839, Jun. 24, 1985, which is a continuation-in-part of Ser. No. 318,219, May 24, 1982, abandoned. This application Jul. 11, 1986, Ser. No. 884,789
Int. Cl.[4] F16L *21/02*
U.S. Cl. 285—55 **3 Claims**

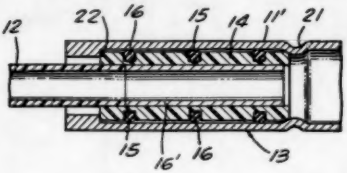
1. A transition fitting for interconnecting synthetic plastic pipe with a larger metal pipe which automatically compensates for thermal expansion and force related differentials between the plastic pipe and metal pipe, comprising:

a metal pipe section of outer diameter substantially equal to that of the metal pipe, one end portion of the pipe section

formed to permit welded abutment with an end of the metal pipe, and a shoulder formed on an inner wall surface adjacent the pipe section other end;

a cylindrical plastic member slidingly received within the pipe section having a first end abutting against the metal pipe section shoulder, said member having an axial opening extending completely therethrough, one end portion of said member opening having a diameter substantially identical to the plastic outer pipe diameter and adapted to be sealingly secured thereto;

O-ring means on the circumferential surface of the cylindrical plastic member contacting the pipe section internal wall for establishing a movable seal therebetween;



a metal sleeve affixed within the cylindrical plastic member axial opening and continuously engaging the plastic member walls defining said axial opening and underlying the O-ring means, an end of the metal sleeve forming a shoulder in the plastic member axial opening against which the plastic pipe abuts; and

an inwardly directed ridge rolled into the metal pipe section engaging the second end of the plastic member for securing the cylindrical plastic member against longitudinal movement while allowing rotational movement between the metal pipe section and plastic member.

4,715,625

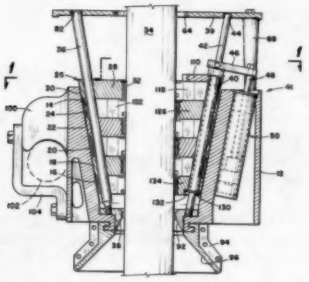
LAYERED PIPE SLIPS

Jess W. Shows, Jr., Maurice, and Asadollah Hayatdavoudi, Lafayette, both of La., assignors to Premiere Casing Services, Inc., Lafayette, La.

Filed Oct. 10, 1985, Ser. No. 786,950

Int. Cl.[4] B65H *59/10*

U.S. Cl. 285—145 **27 Claims**



1. Apparatus for supporting a pipe in a vertical position comprising:

a support member having an upper surface and a lower surface and a passage formed therethrough between said upper and lower surfaces, said passage having an inwardly tapered surface between said upper and lower surfaces;

a first pair of substantially arcuate slip segments receivable in said passage, said slip segments having inwardly tapered edges which ride on said tapered surface when said segments are so received for clamping a pipe in said passage as said segments are lowered therein; and

a second pair of substantially arcuate slip segments receivable in said passage above said first pair, said second pair of segments having inwardly tapered edges which ride on said tapered surface when said second segments are so received for clamping a pipe in said passage as said second segments are lowered therein; wherein when said first and second segment pairs are so received, said first pair of segments are opposite one another, said second pair of segments are opposite one another and said first pair is staggered relative to said second pair.

4,715,626

CLAMPING SLEEVE WITH A CLAMPING SCREW

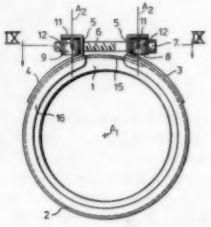
Manfred Gehring, Freudenstadt, Fed. Rep. of Germany, and Heinz Pliiss, Courtaman, Switzerland, assignors to Mage AG, Switzerland

Filed Sep. 12, 1985, Ser. No. 775,483

Claims priority, application Fed. Rep. of Germany, Sep. 27, 1984, 3435368; Jul. 3, 1985, 85108205

Int. Cl.[4] F16L *49/00*

U.S. Cl. 285—230 **17 Claims**



1. In a clamping sleeve for joining pipes which may be of differing diameters and having a rubber-elastic sealing ring which has at least one beading projecting radially inward at each of its ends, a clamping ring which encircles the sealing ring and is in the form of a sheet-metal strip bent in a circular shape about a central axis and on the ends of which are attached opposing clamping plates which extend generally radially outward, and clamping means for drawing the clamping plates toward each other to secure the clamping sleeve in clamping engagement with pipes to be joined and including a clamping screw extending through the clamping plates, the improvement wherein said clamping means includes a pair of intermediate pieces, each of said intermediate pieces being received on said clamping screw outward of an associated one of the clamping plates, each of said intermediate pieces being at least partially cylindrical and defining a partially cylindrical bearing surface engaging an associated one of said clamping plates, each of said intermediate pieces being arranged with the axis of its partially cylindrical bearing surface being parallel to a plane that is perpendicular to said central axis.

4,715,627

Patent Not Issued For This Number

4,715,628

CHILD RESISTANT CABINET LOCK COMBINATION FINGER LOCK

Satya S. Brink, R.R. 1, Box 836, Chelsea, Quebec, Canada J0X 1N0; John H. Baines, and Suzanne C. M. Poulin, both of 16 Beckwith Rd., Ottawa, Ontario, Canada K1S 0K7

Filed Nov. 21, 1985, Ser. No. 800,549

Int. Cl.[4] E05C *19/06*

U.S. Cl. 292—19 **11 Claims**

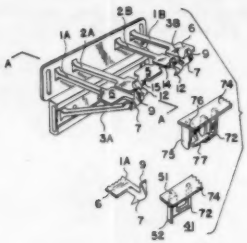
1. A lock for a door or drawer or the like, movable with respect to a frame, to restrict children from gaining entry, the lock comprising:

(a) a base to be attached to the door or drawer,

(b) a pair of locking protrusions, secured to the base, with

ends normally to interlock with catches to be attached to the cabinet frame, the locking protrusions positioned to be pushed downwards with the index and 3rd finger of an adult so as to clear the catches,

(c) blocking protrusions secured to the base, an interconnecting-bar means joining the blocking protrusions, movement of the interconnecting-bar means causing corresponding movement of the blocking protrusions, the interconnecting-bar means positioned to be pushed downwards with the middle finger of an adult, the blocking protrusions to engage with the locking protrusions and



prevent their depression and thereby prevent opening of the door or drawer when: (i) the interconnecting-bar means is in undepressed position or (ii) when the interconnecting-bar means and locking protrusions are depressed before the blocking protrusions so that the locking protrusions remain interlocked with the catches on the cabinet frame, and when the interconnecting-bar means and blocking protrusions are depressed before the locking protrusions, the blocking protrusions to disengage from the locking protrusions to allow the locking protrusions to move away from the catches on the cabinet frame upon being pushed downwards with the index and 3rd finger.

4,715,629

CHILD PROOF CLOSURE DEVICE FOR DOORS

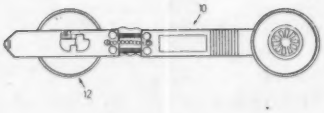
Alan J. Robinson, 202 Westminster St., Christchurch, New Zealand

Filed Dec. 12, 1985, Ser. No. 808,116

Claims priority, application New Zealand, Oct. 30, 1985, 209380

Int. Cl.[4] E05B 65/06

U.S. Cl. 292—256 **15 Claims**



1. A child proof locking system having a first part with a first lock means, a second part with a second lock means, means for expanding the first part with one hand to engage the first lock means with the second lock means, and interengaging means on the first and second parts for moving one of the lock means to a locking position upon release of the first part by the one hand, whereby only the one hand is required to lock the system, and from which locking position a first hand is required to expand the first part and a second hand is required to manipulate said one of the lock means to unlock the system.

4,715,630

ENERGY ABSORBING VEHICLE BUMPER

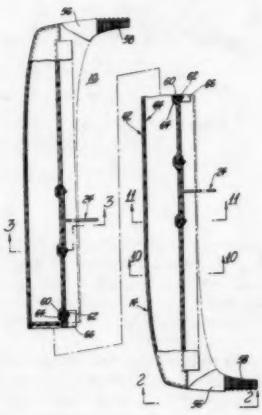
Donald L. Manning, Orchard Lake, Mich., assignor to Transpec Inc., Troy, Mich.

Filed Apr. 28, 1986, Ser. No. 856,658

The portion of the term of this patent subsequent to Jul. 1, 2003, has been disclaimed.

Int. Cl.[4] B60R 19/08

U.S. Cl. 293—120 **4 Claims**



1. An energy absorbing vehicle bumper system of the type including a pair of identical beam members **(16)** adapted to be joined by a common plate member **(66)** at their horizontally inner ends to provide a bumper support structure for spanning the front end of a vehicle, bracket means **(24)** for mounting said beams to the vehicle, and energy absorbing means supported upon said beam on the side thereof opposite from the bracket means, said energy absorbing means including a deflectable member **(44)** enclosed by an elastomeric outer cover means **(42)**, the improvement comprising:

A. each beam **(16)** having

(1) a generally U-shaped cross-section with a vertical wall portion **(18)**;

(2) a pair of horizontal leg portions **(20** and **22)** projecting rearwardly from the upper and lower edges of the vertical wall portion and away from said energy absorbing means;

(3) said vertical wall portion **(18)** including a front face **(48)** proximate said energy absorbing means;

B. the energy absorbing means comprising a hollow, rigidified and deflectable structural member **(44)** having a rear wall **(46)** secured to the front face **(48)** of the vertical wall portion **(18)** of said beam member;

C. the abuttingly adjacent front face **(48)** of beam **(16)** and rearwall **(46)** of hollow member **(44)** being formed to provide coacting recesses and projections **(50** and **52)** to resist relative sliding movement between beam **(16)** and member **(44)**;

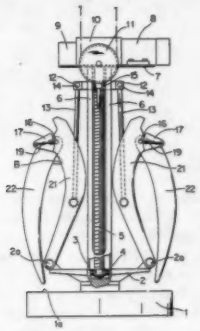
D. fastening means **(36)** for securing said beam members to said bracket means; and

E. said elastomeric cover means **(42)** enclosing the energy absorbing means and at least a portion of the cooperating beam member.

4,715,631
LIFTING MAGNET UNIT WITH A GRIPPING MECHANISM

Shigemi Nakajima, Osaka, Japan, assignor to Kabushiki Kaisha Nakajima Tekkosho, Osaka, Japan

Filed Sep. 24, 1986, Ser. No. 911,079
Claims priority, application Japan, Nov. 29, 1985, 60-267479; Apr. 17, 1986, 61-87018; Apr. 17, 1986, 61-87019; Apr. 22, 1986, 61-91209
Int. Cl.[4] B66C *3/16*
U.S. Cl. 294—2 **14 Claims**

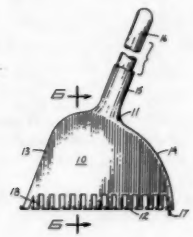


1. A lifting magnet unit with a gripping mechanism, which comprises: a lifting magnet; a bracket attached to the upper surface of the lifting magnet opposite the attracting surface of the same; a screw rod supported upright and rotatably at one end on the bracket; a base plate disposed at the other end of the screw rod; a motor for rotating the screw rod, disposed on the base plate; a frame fixed at the lower end to the bracket and at the upper end to the base plate; a spider block having an internally threaded center hole engaging the screw rod; and a plurality of gripping arm assemblies each comprising a first arm pivotally joined at one end thereof to the extremity of one of the arms of the bracket with a pin, a second arm pivotally joined at one end thereof to the other end of the first arm with a pin, a rod pivotally joined at one end thereof to the spider block with a pin and at the other end thereof to the middle part of the first arm with a pin, and a locking mechanism for locking the second arm to the first arm by inserting a pin into a hole formed in the second arm.

4,715,632
RECEIVING AND LIFTING DEVICE FOR GROUND OR FLOOR OBJECTS

Kenneth McVey, Paulsen Medical/Dental Building, Spokane, Wash. 99201

Filed Sep. 22, 1986, Ser. No. 909,948
Int. Cl.[4] A63B *47/02*
U.S. Cl. 294—19.1 **2 Claims**



1. A manually useable device for receiving and lifting three-dimensional objects freely resting on a ground or floor surface in an individual manner, comprising:

a pair of transversely spaced upright walls having upper and lower ends extending between upright, unobstructed front and back edges, the walls being arranged in non-parallel, converging side-by-side positions and being joined to one another across their respective upper ends;

handle means extending upwardly from the joined upper ends of the walls for facilitating manual positioning of the walls relative to a ground or floor surface without bending or stooping movement by a user;

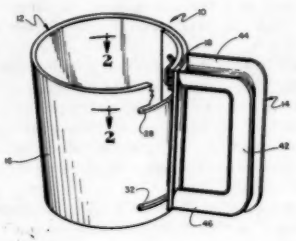
the respective lower ends of the walls being provided with a row of inwardly protruding resilient fingers projecting partially across the space separating the walls, the inner ends of the fingers in one row being normally transversely spaced apart from the inner ends of the fingers in the remaining row and being adapted to engage beneath an object on a ground or floor surface when the walls are moved apart and together as the fingers slide over exterior surfaces of the object while the device is moved downwardly over it;

the pair of walls being spaced apart a greater distance at their front edges than at their back edges to free an object lifted within the device to fall gravitationally between the front edges of the walls and into a waiting receptacle when the device is tilted forwardly.

4,715,633
CUP HOLDER

Douglas F. Brink, and John MacConnell, both of Ft. Collins, Colo., assignors to Benchmark Ventures, Ft. Collins, Colo.

Continuation-in-part of Ser. No. 727,873, Apr. 26, 1985, abandoned. This application Apr. 25, 1986, Ser. No. 856,053
Int. Cl.[4] A47J *45/10*; B65D *23/10*
U.S. Cl. 294—31.2 **16 Claims**



1. A device for holding a disposable cup or the like, comprising:

a coiled member having two end portions overlapping each other to define a central opening for receiving a cup, one of said end portions being the outer end portion and the other said end portion being the inner end portion with the outer end portion overlapping the inner end portion, the extent of overlap of said end portions being variable for adjustment of the size of said central opening for receiving and gripping various sized cups, said coiled member also having an elongated slot in said inner end portion and an opening in said outer end portion aligned with the slot in the inner end portion;

handle means associated with said coiled member for providing a convenient handle member to hold said coiled member; and

combination connecting and attachment means positioned in said slot and in said opening for maintaining said inner and outer end portions in abutting, interconnected relationship while permitting relative sliding movement therebetween throughout the length of said slot to enable expansion and contraction of said coiled member and for attaching said handle means to said coiled member.

4,715,634
WEED EXTRACTING TOOL

Teresa L. Mueller, and Michael W. Mueller, both of 1329 W. Laguna Azul, Mesa, Ariz. 85202

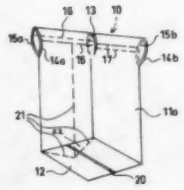
Filed Mar. 3, 1987, Ser. No. 21,205
Int. Cl.[4] A01B 1/16
U.S. Cl. 294—50.5 12 Claims

1. A tool for extracting weeds and soil from the ground, the tool comprising:
(a) a T-shaped handle having a lower end and an upper end;
(b) a cutting head, said cutting head including,
(i) a tubular housing secured to the lower end of said handle,
(ii) a blade depending from said housing; and
(c) ejector means mounted for reciprocation within said tubular housing for dislodging trapped soil and weeds from said cutting head, said ejector means including,
(i) shaft means coaxially disposed within said housing,
(ii) a plunger member depending from a lower end of said shaft means,
(iii) biasing means for biasing said shaft means and said plunger member downwardly to an extended position, and
(iv) latching means for holding said shaft means and said plunger member in a retracted position against the bias of said biasing means, said latching means comprising elements of a releasable interconnection on said shaft means and on said tubular housing for releasably securing said shaft means to said housing, said elements of a releasable interconnection including,
(1) a keyhole shaped slot formed in said tubular housing, said slot including an elongated relatively narrow portion depending from an upper circular portion
(2) elongated knob means movably connected to said shaft means, said knob means being disposed to extend through said keyhole shaped slot of said tubular housing and including a reduced diameter portion and a larger diameter portion and being movable from a first position in which said larger diameter portion extends through said circular portion of sid keyhole shaped slot to a secured position in which said reduced diameter portion is slidable in said elongated relatively narrow portion of said keyhole shaped slot and
(3) means for biasing said knob means to said first position.

4,715,635
FLEXIBLE CONTAINER FOR TRANSPORTING AND STORING BULK GOODS

Erkki Koskinen, Pori, Finland, assignor to Oy W. Rosenlew Ab, Finland

Filed Aug. 12, 1981, Ser. No. 292,149
Claims priority, application Finland, Aug. 14, 1980, 802555
Int. Cl.[4] B65D 29/00, 88/56
U.S. Cl. 294—68.1 5 Claims

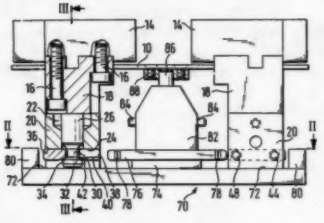


1. A flexible container for transporting and storing bulk goods, said container being constructed from a tubular blank having an open free lower margin and formed so as to include a shell, a bottom and a filling aperture, said container being liftable by its upper end, comprising:
said free open lower margin of the tubular blank being closed by a bottom seam extending substantially over the central region of said container bottom; and
substantially longitudinal pleats being formed in said shell, each pleat hving a lower part proximate to said container bottom folded in a manner so as to be coplanar with said container bottom, said lower pleat part including an upper plane and a lower plane, and wherein sid upper plane of each pleat part is folded down into the plane of said container bottom and affixed to said lower plane of said pleat part by a connecting seam.

4,715,636
GRIPPER INCLUDING AN EXCHANGEABLE GRIPPING JAW

Franz Wiesner, Owen/Teck, and Horst Etzel, Hochdorf, both of Fed. Rep. of Germany, assignors to Traub AG, Fed. Rep. of Germany

Filed Mar. 14, 1986, Ser. No. 839,683
Claims priority, application Fed. Rep. of Germany, Apr. 15, 1985, 3513453
Int. Cl.[4] B25J 15/04
U.S. Cl. 294—86.4 10 Claims



1. A gripper, especially for automatic handling machines with which at least one male coupling member is adapted to be coupled to a female coupling member by means of a coupling comprising
a coupling opening and a locking member opening disposed transversely thereof in said at least one female coupling member,
a coupling plug extending away from said at least one male coupling member and being insertable in the coupling opening and having a lateral recess,

a locking member engaging in the locking member opening and in the recess at the same time when in a locking position, thereby locking the coupling plug in the coupling opening,

the at least one female coupling member, coupling plug, and locking member being clamped together by a spring assembly in the locking position,

and the locking member having a surface for application of an external force by which it is movable into a release position at which the coupling plug can be pulled out of the coupling opening,

wherein

the spring assembly is adapted to be tensioned in longitudinal direction of the coupling plug,

the locking member has a second surface opposite the surface mentioned for application of an external force by which it is movable into the locking position,

the locking member further has a wedge surface which cooperates with a limiting surface of the recess formed at the coupling plug to clamp the spring assembly when the locking member is moved into the locking position, and

a jaw deposit is arranged within the operating range of the gripping jaw against which deposit the locking member is adapted to be pressed selectively by its first or second surface for application of a force.

4,715,637

GRIP DEVICE FOR SHEET-LIKE OBJECTS

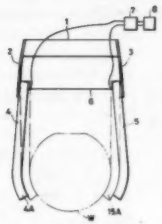
Yuji Hosoda, Chiyoda; Kazuo Honma, Ami, and Masakatsu Fujie, Ushiku, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Apr. 17, 1986, Ser. No. 853,450

Claims priority, application Japan, Apr. 17, 1985, 60-80110; Apr. 17, 1985, 60-80111; Apr. 19, 1985, 60-82309

Int. Cl.[4] B25J *15/04*; B66C *1/10*

U.S. Cl. 294—86.4 **24 Claims**



1. A gripping means for gripping an outer peripheral edge of a sheet-like object, the gripping means comprising a base means, grip members mounted on said base means for gripping the object, elastic means disposed on respective sides of the base means for respectively connecting said grip members to said base means so as to urge the respective grip members in one of an opening and closing direction, at least one shape memory means for coupling said grip members to each other, and a power source connected to said shape memory means through a switch means.

4,715,638

ROBOTIC HAND WITH SLIP COUPLINGS

Francis T. Chambers, Rock House, Ballycroy, Westport, County Mayo, Ireland

Filed May 14, 1986, Ser. No. 862,946

Claims priority, application Ireland, May 14, 1985, 1190/85

Int. Cl.[4] B66C *3/16*

U.S. Cl. 294—88 **21 Claims**

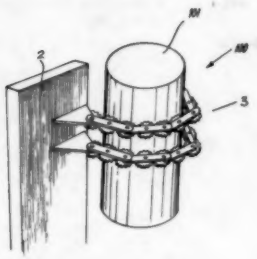
1. A robotic hand for gripping regularly shaped and irregularly shaped objects, comprising:

(a) a base support;

(b) a jointed finger, mounted on the base support and formed by a plurality of link elements;

(c) a pivot joint between each link element;

(d) a drive means for each link element for pivoting a link element about another link element in which each drive means is interconnected to form a sequential drive from an innermost link element adjacent the base to an outermost link element; and



(e) a slip coupling between each link element and an associated drive means to prevent further pivoting of the link element and to transfer drive from an inner link element to a next outermost link element, said coupling operating when the pressure exerted by said inner link element on an object being gripped exceeds a pre-set pressure to cause the coupling to slip.

4,715,639

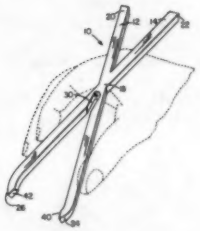
GRASPING UTENSIL

Roger A. Nicoletta, and Emil Downey, both of 34 Connecticut Blvd., E. Hartford, Conn. 06018

Filed Dec. 4, 1986, Ser. No. 938,008

Int. Cl.[4] A47G *21/10*; B25B *9/02*

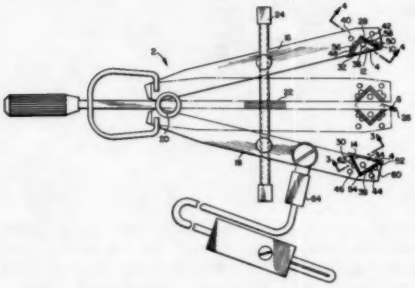
U.S. Cl. 294—99.2 **8 Claims**



1. A hand-operated utensil for grasping and picking upfood or other articles comprising : a pair of elongated handling and grasping elements, each having corresponding upper and lower ends, the elements being arranged in intersecting and integrally interconnected relationship at a position of intersection intermediate the upper and lower ends, the lower portions of the elements between the intersection and the lower ends being made flexible toward and away from each other for grasping articles with the lower ends by stress-relieving recess means including at least one recess extending into the lower portion of one element adjacent the intersection to reduce the transverse cross section of said one element at the recess and form a flex hinge permitting flexing movement of said one element toward the other element, and the upper portions of the elements between the intersection and the upper ends being rigid relative to one another and diverging away from one another for a distance between the intersection and the upper ends to thereby provide above the intersection a stationary, non-flexing and broad based support in contact with the

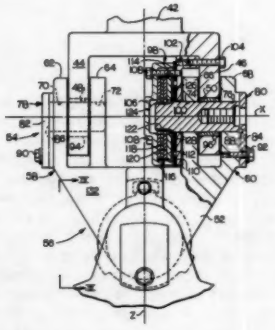
knuckle area of the hand, and below the intersection, a flexible tweezers for grasping articles when the utensil is held with the lower portions and intersection between the thumb and forefinger.

4,715,640
LOCATOR
Vincent P. Barkley, Arlington, Va., assignor to Pace Incorporated, Laurel, Md.
Filed Aug. 6, 1985, Ser. No. 762,868
Int. Cl.[4] H05K *13/04*
U.S. Cl. 294—106 **11 Claims**



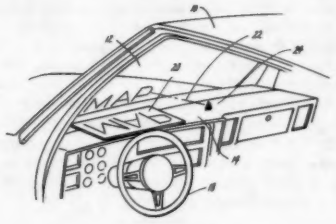
1. A locator device for locating modular electronic components centrally with respect to a nozzle of an apparatus for attaching said componenis to a substrate, said locator device comprising:
component support means for supporting a component to be located centrally with respect to the nozzle of a component attachment apparatus;
component centralizing means associated with said component support means and engageable with said nozzle for centralizing said component with respect to said nozzle.

4,715,641
MOUNTING APPARATUS FOR A GRAPPLE HEAD ASSEMBLY
Marvin K. Palmer, Oswego, Ill., assignor to Caterpillar Inc., Peoria, Ill.
Filed Sep. 11, 1986, Ser. No. 906,066
Int. Cl.[4] F16F *7/08*
U.S. Cl. 294—119.4 **19 Claims**



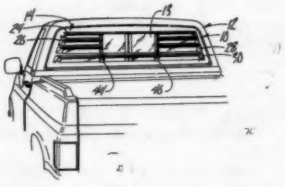
1. A mounting apparatus, comprising:
a first member having first and second spaced-apart mounting flanges;
a second member having first and second spaced-apart mounting flanges and being positioned in inwardly adjacent relation to the respective first and second mounting flanges of the first member and being secured thereto for relative rotation about a first axis; and
means for resisting relative rotation about said first axis, said means being positioned between and substantially encompassed within the profile of the mounting flanges of the second member.

4,715,642
MAP DISPLAY
Paul T. Dobbs, 16083 Southampton, Livonia, Mich. 48154
Filed Oct. 2, 1986, Ser. No. 914,676
Int. Cl.[4] B60R *27/00*
U.S. Cl. 296—1 R **1 Claim**



1. In a vehicle having a driver's compartment, a dashboard having a top surface, and a windshield mounted above the dashboard for a driver in the driver's compartment to view oncoming traffic conditions along a line of sight, the combination comprising:
a sheet element having a reverse image of a map thereon, the sheet element being removeably mounted on the top surface of the dashboard in such a position that a mirror image thereof is reflected on the windshield in the path of said line of sight so as to be viewable along said line of sight of the driver whereby he need not change his line of sight for viewing oncoming traffic conditions to view said mirror image but only refocus his eyes to read the mirror image of the map on the windshield, and
a film mounted on the inside surface of that portion of the windshield on which the mirror image of the map is being reflected so as to eliminate any double image thereof at such time as the line of sight is focused on said mirror image.

4,715,643
REAR WINDOW LOUVER FOR PICKUP TRUCKS AND METHOD FOR MAKING SAME
Diego Butler L., Richardson, Tex., assignor to Deflecta-Shield Corp., West Des Moines, Iowa
Filed Mar. 2, 1987, Ser. No. 20,472
Int. Cl.[4] B60J *3/00*
U.S. Cl. 296—97 A **11 Claims**



1. A universal rear window louvered unit for pickups, comprising:
a louvered window frame of generally conforming shape to a pickup truck rear window;

said frame having a perimeter edge portion of general conforming configuration to a pickup rear window; and

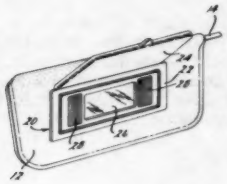
a series of spaced apart louvers extending across said frame; said louvers each having a flush mount bottom portion therebetween adapted for easing planer cutting removal.

4,715,644

SPRING-LOADED HINGE ASSEMBLY FOR VEHICLE ACCESSORIES

Mark Lobanoff, Troy, and James A. Gavagan, Centerline, both of Mich., assignors to Irvin Industries, Inc., Rochester Hills, Mich.

Filed Sep. 22, 1986, Ser. No. 910,129
Int. Cl.[4] B60J 3/02
U.S. Cl. 296—97 H 16 Claims



1. A spring-loaded hinge assembly for interconnecting an accessory door with an accessory housing structure for a vehicle, said hinge assembly comprising: pivot means pivotally interconnecting the door with the housing structure for rotational movement of the door relative to the housing structure about a longitudinally-extending axis; a cam member protruding in a generally lateral direction from the door for rotational movement therewith; said cam member having at least one dwell portion thereon; leaf spring means on the housing structure and slidably and resiliently deflectably engageable by said cam member for exerting a resilient biasing force on said cam member; and support means interconnected with the housing structure for supporting said leaf spring means in a direction generally opposite the direction of said engagement of said leaf spring means by said cam member, said support means supporting said leaf spring means at least at two spaced-apart support locations thereon, said cam member deflectably engaging said leaf spring means at a medial location thereon between said spaced-apart support locations, said leaf spring means tending to maintain the door in a predetermined rotational orientation relative to the housing structure when engaged by said dwell portion of said cam member.

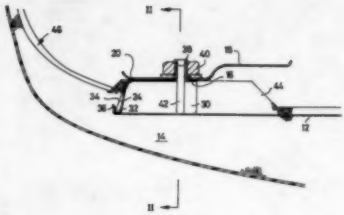
4,715,645

BUMPER BAR FOR A MOTOR VEHICLE

Idris Lewis, Chelmsford, and John Churchill, Southend on Sea, both of United Kingdom, assignors to Ford Motor Company, Dearborn, Mich.

Filed Mar. 3, 1987, Ser. No. 21,101
Claims priority, application United Kingdom, Mar. 12, 1986, 8606163
Int. Cl.[4] B60R 19/08
U.S. Cl. 296—120 R 16 Claims

1. A bumper comprising a plastic skin, brackets molded integrally with the skin adapted for mounting the bumper on a vehicle, a strap extending across the bumper laterally with respect to the vehicle, inside the skin, and supported at its ends



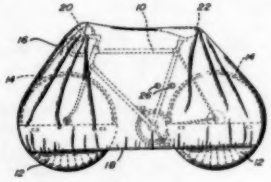
by the brackets, and a plastic foam filling molded in situ within the skin and encapsulating the strap.

4,715,646

PROTECTIVE COVERING FOR LIGHTWEIGHT VEHICLE

Carlo P. Goffi, and Deborah E. Clark-Goffi, both of 4972 Suzanne, Pierrefonds, Quebec, Canada H8X 1Z9

Filed Mar. 2, 1987, Ser. No. 20,910
Int. Cl.[4] B60R 9/10
U.S. Cl. 296—136 5 Claims



1. Protective covering for a lightweight vehicle having at least two spoked wheels, the covering comprising:

semi circular sheath wheel covers for each wheel having an opening slit to fit over the wheel, each of the wheel covers formed of flexible waterproof sheet material, each of the wheel covers having wheel cover attachment means located across the opening slit to attach each of the wheel covers to the wheel at the opening slit and hold each of the wheel covers to the wheel, and

an overall cover having a bag like shape with an opening, the overall cover shaped to fit over the vehicle extending down to overlap the wheel covers on the wheels, the overall cover formed of flexible waterproof sheet material, and having overall cover attachment means to the vehicle.

4,715,647

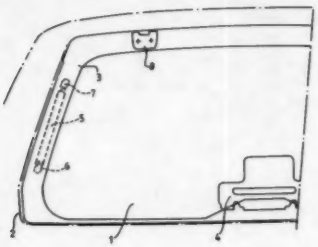
FRAMELESS TURN-UP REAR WINDOW FOR VEHICLES

Ralph Mynott, Nuenen, and Johan Verbeek, Eindhoven, both of Netherlands, assignors to 501 Volvo Car B.V., Helmond, Netherlands

Filed Oct. 9, 1986, Ser. No. 916,912
Claims priority, application Netherlands, Oct. 10, 1985, 8502761
Int. Cl.[4] B60J 1/18
U.S. Cl. 296—152 9 Claims

1. A frameless turn-up rear window for vehicles, characterized in that at some distance from its outer edge a U-shaped metallic profile strip has been fixed all round by cementing

onto the inside of the window, which strip has an open side facing the interior of the vehicle and is provided with means of



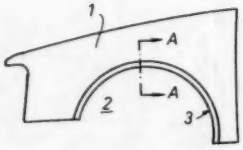
attachment for one or more of those ancillary parts which are commonly used for the proper functioning of the rear window.

4,715,648

ARRANGEMENT FOR INCREASING THE BODY WIDTH AT WHEEL HOUSINGS OF A VEHICLE

Werner Hensel, Trollhättan, Sweden, assignor to Saab-Scania Aktiebolag, Sodertalje, Sweden

Filed Oct. 6, 1986, Ser. No. 915,517
Claims priority, application Sweden, Oct. 4, 1985, 8504603
Int. Cl.[4] B62D *25/00*
U.S. Cl. 296—198 **8 Claims**



1. Arrangement for increasing the body width at wheel housings of a vehicle body provided with a trim detail gripping round an edge at a wheel housing opening, characterized in that the trim detail is of substantially U-shaped cross section, said trim detail being at least partially surrounded by a body member which is also of substantially U-shaped cross section and which in the transverse direction of the body extends beyond the trim detail and which is formed with abutments on the inner surface thereof on either side of the edge, said abutments gripping round and coacting with abutments or the like on the trim detail for locating and fixing the body member to the trim detail.

4,715,649

LOCATOR AND HOLD-DOWN LATCH FOR REMOVABLE VEHICLE ROOF PANELS

Leonard F. Bores, Dearborn, and Mark J. Zdziarski, Taylor, both of Mich., assignors to ASC Incorporated, Southgate, Mich.

Filed Dec. 29, 1986, Ser. No. 947,031
Int. Cl.[4] B60J *7/10*
U.S. Cl. 296—218 **8 Claims**

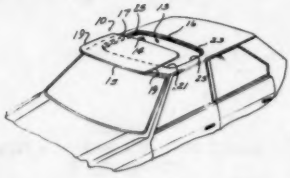
1. A locator and hold-down latch for a removable sunroof panel having front and rear edges and designed to fit in a roof opening of a vehicle, said latch comprising:

a tapering finger connector mounted on the center of the rear edge of the panel and extending outwardly and rearwardly therefrom;

a detent formed on a bottom face of the finger connector and extending through the width thereof;

a tapering slot connector adapted to receive the finger connector, said slot connector being formed in the center of a rear edge of the opening; and

a cylinder fixedly mounted on a bottom face of the slot connector and extending laterally therethrough adapted



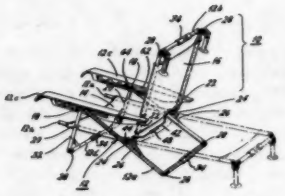
to engage the detent when the finger connector is inserted into the slot connector thereby serving to align and latch the connectors to each other and the panel to the vehicle and to prevent axial displacement therebetween.

4,715,650

FULLY COLLAPSIBLE PORTABLE CHAIR

Cary Berman, 450 Merion Rd., Merion, Pa. 19066, and Steven Kiss, 10616 Lockart Rd., Philadelphia, Pa. 19116

Continuation of Ser. No. 831,218, Feb. 20, 1986, abandoned.
This application Apr. 6, 1987, Ser. No. 33,866
Int. Cl.[4] A47C *4/00*
U.S. Cl. 297—28 **10 Claims**



1. In a collapsible chair having a frame of joined vertical and horizontal members defining a seat, a back, and a plurality of ground supports, said frame capable of being compacted by folding the seat, back, and ground supports together into a flattened unit, containing an improvement comprising

providing a set of first vertical members and a set of second vertical members, the vertical members of each set positioned parallel to and in a plane with each other;

said set of first vertical members being hingedly connected by at least one horizontal member, said horizontal member being provided with a hinged joint intermediate its ends permitting said horizontal member to be folded into two sections assuming a position approaching substantially parallel to, and within the plane of, said first vertical members;

said set of second vertical members being hingedly connected by at least one horizontal member, said horizontal member being provided with a hinged joint intermediate its ends permitting said horizontal member to be folded into two sections assuming a position approaching substantially parallel to, and within the plane of, said second vertical members;

wherein the planes of said set of first vertical members and said set of second vertical members approach a position of parallel to each other when said chair is folded into a flattened unit;

said hinged joint comprising a flexible ligament affixed to two end plugs, and a sleeve;

said ligament being of sufficient width and being affixed to said end plugs off center so to create a directional bias, allowing said hinged joint to fold fully in only one direction;

said end plugs being adapted to join to and connect the sections of said horizontal members and maintain said members a fixed linear distance apart when said members are coaxially aligned; and

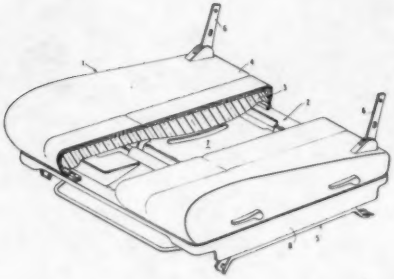
said sleeve being positioned around said horizontal member and adapted to slide to surround and to traverse said ligament and hold said sections of the horizontal member in linear relationship to each other.

4,715,651

DEVICE FOR INSTALLING SKIN ON AUTOMOTIVE SEAT

Fumio Wakamatsu, Okazaki, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Aichi, Japan

Filed Sep. 30, 1986, Ser. No. 913,296
Claims priority, application Japan, Sep. 30, 1985, 60-216986
Int. Cl.⁴ A47C *31/00*
U.S. Cl. 297—219 **2 Claims**



1. A device for installing a skin on a seat pad of an automobile seat having a frame comprising:

L-shaped projection portions (**10**) disposed on the frame of the seat and having flanges (**11**) extending at right angles to the direction in which the skin is stretched on a top portion of the seat pad;

a notched portion (**18**) formed on said frame adjacent each said projection portion wherein said flange of each projection portion and said notched portion each have a step-engaging face portion with a plane parallel to the direction of the extended flange; and

retaining means (**13**) secured on an outer edge of the skin and engaging said projection portion, said retaining means having step portions engaging said step-engaging face portions of at least said flanges, wherein said retaining means comprises;

a fringe member (**14**) having a cylindrical portion contiguous with an end portion, said end portion being secured to the outer edge of said skin;

a retaining member (**13'**) having a generally U-shaped cross section and having first and second step portions disposed on ends thereof, wherein

said retaining member is forcibly fit over said cylindrical portion of the fringe member and slideable thereon, and first and second step portions engage said step engaging face portions of said flange and notch, respectively.

4,715,652

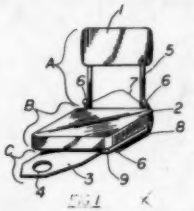
PORTABLE STADIUM SEAT WITH TRAY

James F. Ward, 3412 Chatsworth La., Orlando, Fla. 32806

Filed Dec. 27, 1985, Ser. No. 813,773
Int. Cl.⁴ A47C *7/62*
U.S. Cl. 297—252 **4 Claims**

1. A portable stadium seat comprised of:

a seat bottom portion consisting of a covered seat cushion mounted on two support pieces running from front to back on each side of said cushion, each support piece containing a groove on the inner side thereof, a flat encasement piece connecting both support pieces, said encasement having attached at the front middle thereof a spring-loaded hook-like fastener member which, when in the downward "OPEN" position attaches to the underside of a stadium seat and two tubular elements or rails attached to each side of the encasement piece running from front to back of the encasement piece; and



a back rest portion consisting of a curved cushion which is mounted to the two upper ends of a U-shaped support rail or tubular element, said back portion being attached to the seat bottom portion by means of connecting elements such as rods or rivets; and

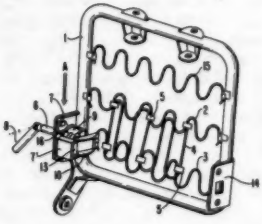
a tray which fits into the grooves between the two support pieces of the seat bottom portion, which can be slidably extended from the front of the seat portion to hold food and drink.

4,715,653

LUMBAR SUPPORT APPARATUS

Takemi Hattori, Kariya, and Nobuhiko Takeda, Ohbu, both of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Japan

Filed Sep. 19, 1986, Ser. No. 909,129
Claims priority, application Japan, Sep. 19, 1985, 60-207262
Int. Cl.⁴ A47C *3/00*
U.S. Cl. 297—284 **1 Claim**



1. A lumbar support apparatus comprising:

a seat frame;

a first support member fixed to said frame, said first support member being made of wire formed in an S-spring;

a second support member attached to said frame, said second support member being made of wire formed in an S-spring and being movable from substantially within a plane defined by said frame to a position forward of said plane;

a third support member interposed between said first and second support members for interconnecting the same and movable with said second support member, said third support member being made of wire formed in an S-spring and connected to said first fixed support member and said second movable support member at a plurality of points; and

a cam mounted for rotation on said frame, said cam having a groove formed thereon;

a movable arm connected to said second support member; and

a cam pin connected to said movable arm and engaging said groove so as to cause movement of said arm upon rotation

of said cam, thereby moving said second support member and the interconnected first and third support members.

4,715,654

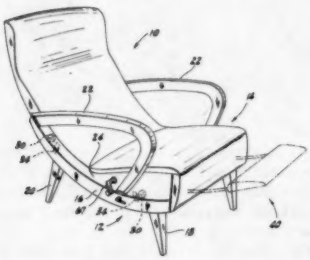
RECLINING CHAIR WITH RETRACTABLE FOOTREST

Joseph F. Laskowitz, 1552 Estrada, Apt. 5, St. Louis, Mo. 63138

Continuation of Ser. No. 837,491, Mar. 7, 1986, abandoned. This application Mar. 17, 1987, Ser. No. 24,921

Int. Cl.[4] A47C 1/02

U.S. Cl. 297—329 12 Claims



1. A chair comprising:

(a) a lower base portion including opposed sides,

(b) an upper seating portion including opposed sides, said seating portion being mounted to said base portion for longitudinal arcuate movement of said seating portion relative to said base portion,

(c) retractable footrest assembly including:

1. guide means operatively carried between said seating portion sides including opposed elongate substantially tubular arcuately formed guide members,
2. a movable footrest including arm means including opposed arcuately formed arm members each received within one of the tubular members of said guide members and a transverse footrest member mounted between said arm members,
3. drive means for moving said arm members in said guide members, said drive means including a pair of longitudinally spaced transverse shafts each having at least one sprocket mounted thereon, an endless chain extending between said sprockets, connection means including a transverse traveller member attached at each end to said arm members and an adaptor member connecting said transverse member to said chain in direct drive relation, and means for moving said chain and said connected traveller member whereby said footrest moves fore and aft relative to said seating portion, and
4. said arcuate arm members extending outwardly of said arcuate guide members along the same generally arcuate line.

4,715,655

RECLINING ANGLE ADJUSTMENT DEVICE

Naoaki Katsumoto, Fujisawa, and Toshihito Miyagawa, Toyota, both of Japan, assignors to Shiroki Kinzoku Kogyo Kabushiki Kaisha, Fujisawa and Toyota Jidosha Kabushiki Kaisha, Toyota, both of, Japan

Filed Nov. 26, 1985, Ser. No. 801,961

Claims priority, application Japan, Nov. 26, 1984, 59-179597

Int. Cl.[4] E05D 11/10; B60N 1/02

U.S. Cl. 297—362 4 Claims

1. A reclining angle adjustment device comprising:

an intermediate gear plate having an outer gear with a rack on an outer edge thereof;

an upper arm having an inner gear meshing with said outer gear of the intermediate gear plate;

an angularly movable shaft on which said intermediate gear plate and said upper arm are angularly movably mounted concentrically and eccentrically thereon, respectively;

a lower arm fixed to a subplate to hold said intermediate gear plate and upper arm between said lower arm and said subplate and in supporting relation to said angularly movable shaft;

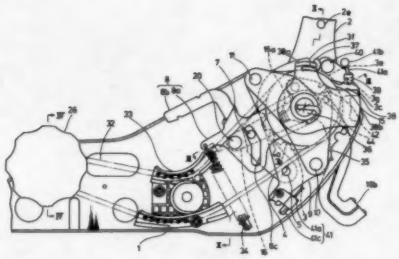
a pawl pivotally mounted on said lower arm and having teeth for selective engagement with said rack of said intermediate gear plate;

a release lever rotatable mounted on said angularly movable shaft for releasing said rack of said intermediate gear plate from said pawl for rough reclining angle adjustment;

a handle shaft rotatably mounted on said lower arm;

a transmission mechanism having driver and driven members, said driver member being mounted on said handle shaft with said driven member being mounted on said angularly movable shaft;

a control handle mounted on said handle shaft for turning said angularly movable shaft through said transmission mechanism to effect fine reclining angle adjustment;



a stopper arm rotatively mounted on said angularly movable shaft and angularly movable by said driven member of the transmission mechanism over a limited path;

a brake mechanism mounted on said handle shaft for selectively preventing said handle shaft and said driver member from rotating to in turn prevent rotation of said driven member;

a first stopper provided in a pin bracket fixed to said lower arm for engaging said stopper arm to limit rotation thereof;

a second stopper provided on said driven member for rotation with said driven member, with said second stopper engaging said stopper arm during movement thereof by said driven member along said limited path; and

said first stopper establishing a range of fine reclining angle adjustment defined by movement of said stopper arm between positions abutting said first stopper in opposite directions.

4,715,656

HINGE JOINT FOR THE SEATS OF MOTOR VEHICLES AND THE LIKE

Hansjörg Walk, Reutlingen, and Heinze-Jürgen Wagener, Remscheid, both of Fed. Rep. of Germany, assignors to Keiper Recaro GmbH & Co., Remscheid, Fed. Rep. of Germany

Filed Jul. 2, 1986, Ser. No. 881,195

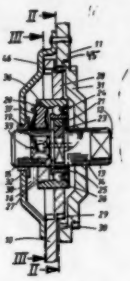
Claims priority, application European Pat. Off., Jul. 2, 1985, 85108181

Int. Cl.[4] A47C 1/025; F16H 55/18

U.S. Cl. 297—362 18 Claims

1. A hinge joint, particularly for changing the mutual positions of two parts of a seat in a motor vehicle or the like, comprising a first component; a second component; means for selectively changing the position of said second component relative to said first component including a shaft rotatably journalled in one of said components, a first gear on said second component, a second gear provided on said first compo-

nent, mating with said first gear and surrounding said shaft, an eccentric interposed between said shaft and said second gear and movable radially of said shaft, and means for yieldably biasing said eccentric radially of said shaft so as to increase the eccentricity of said first and second gears with reference to each other, said second gear having a rotary hub which surrounds said eccentric; and means for moving one of said first and second gears radially of said shaft relative to the other of said first and second gears, comprising a portion which is movable substantially axially of said shaft and means for urging said portion of said moving means substantially axially of said shaft and against said hub.



4,715,657

DOUBLE RANGING DRUM CUTTER HAVING BEDROCK SENSOR BASED ON VIDEO IMAGE PROCESSING SYSTEM

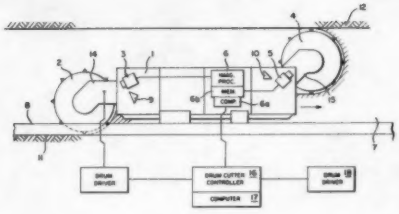
Koji Sato, Chiba; Hiroshi Kuroda, Omuta; Ryuji Yamada, Omuta, and Mamoru Serino, Omuta, all of Japan, assignors to Zaidan Hojin Sekitan Gijutsu Kenkyusho; Mitsui Sekitan Kogyo Kabushiki Kaisha and Kabushiki Kaisha Mitsui Miike Seisakusho, all of Tokyo, Japan

Continuation-in-part of Ser. No. 703,267, Feb. 20, 1985, abandoned. This application Aug. 26, 1986, Ser. No. 900,419

Claims priority, application Japan, Feb. 23, 1984, 59-31470

Int. Cl.[4] E21C *35/08*

U.S. Cl. 299—1 **1 Claim**



1. A double ranging drum cutter of the long wall type machine for the extraction of coal which is designed to move longitudinally on a face conveyor set on a bed of rock and coal, the front of the face conveyor also extending along the coal layer, in combination:

(a) an elongated carrier body **(1)** with a defined front and rear, said front being in the direction of movement of said carrier body when in a cutting mode of operation, said carrier body being adapted and designed to move along the face conveyor;

(b) a rear cutter drum assembly including a rear support arm **(14)** attached to the carrier body, said rear assembly including a first drum driver on said support arm, also a rear vertically rotating cutter drum **(2)** supported by said rear support arm;

(c) a front cutter drum assembly including a forward support arm **(15)** with a transversal shaft disposed on the front side of the carrier body **(1)**, said front assembly including a second drum driver located on said support arm, also, a forward vertically rotating cutter drum **(4)**, supported by said forward support arm;

(d) front and rear infrared television cameras **(3,5)** and assemblies for picking up an image of a portion of the lower and upper bed of rock and coal being cut by the front and rear cutter drums, each assembly including an infrared ray projector **(9, 10)** for projecting infrared rays onto the the surface being cut so that said surface in turn can be viewed by said cameras **(3,5)**, and,

(e) a video image processing unit **(6)** mounted on the carrier body **(1)** and electrically connected to the front and rear television cameras **(3, 5)** including a first microcomputer **(6*a*)** to transform the received video signals into a binary code unit, a memory **(6*b*)** to store the signals, a drum cutter control **(16)** mounted on the carriage body, coupled to each cutter drum driver **(18)**, a second microcomputer **(17)** for counting said binary code units and causes the controller **(16)** to control the action of the cutter drums.

4,715,658

PLANING MACHINE FOR THE MINING OF MINERALS

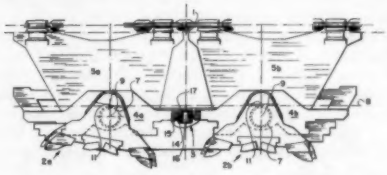
Gert Braun, and Ernst Braun, both of Essen-Heisingen, Fed. Rep. of Germany, assignors to Halbach & Braun Industrieanlagen, Fed. Rep. of Germany

Continuation of Ser. No. 778,556, Sep. 20, 1985, abandoned. This application Feb. 26, 1987, Ser. No. 20,131

Claims priority, application Fed. Rep. of Germany, Sep. 20, 1984, 3434518

Int. Cl.[4] E21C *25/42*

U.S. Cl. 299—34 **4 Claims**



1. A planing machine for the mining of minerals, particularly the underground mining of coal using a planing chain guided on the filling side of a conveyor chute having a side wall on a side opposite to the filling side, comprising two individual planes **(2*a*, 2*b*)** lying side-by-side along the conveyor chain, an articulated connection interconnecting said planes and permit relative pivoting between said planes in vertical and horizontal directions, each plane comprising a plane body **(4*a*, 4*b*)** and a sword plate **(5*a*, 5*b*)** connected to said plane body and having a portion extending under the conveyor chute and connected to the planing chain, a horizontally extending roller centrally carried by each of said planes, each horizontal roller being mounted for rotation about a vertical axis to one of said plane bodies, each roller being at least partly exposed for rolling against the side wall of the chute for permitting movement of each plane body along the side wall of the chute while also permitting rotation of each plane body about the vertical axis of its horizontal roller, said sword plates of said planes being individually connected to the planing chain and being unconnected from each other from one plane to the other for permitting horizontal and vertical pivoting between said planes only through said articulated connection.

4,715,659

MINERAL MINING INSTALLATIONS

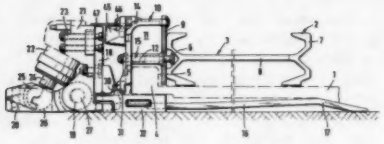
Christoph Rassmann, Lünen; Gerhard Nickel, Selm; Bernd Steinkuhl; Gerhard Merten, both of Lünen, and Egon Pfefferle, Hamm, all of Fed. Rep. of Germany, assignors to Gewerkschaft Eisenhutte Westfalia GmbH, Lunen, Fed. Rep. of Germany

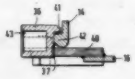
Filed Sep. 16, 1986, Ser. No. 907,940

Claims priority, application Fed. Rep. of Germany, Sep. 17, 1985, 3533107; May 27, 1986, 3617737

Int. Cl.[4] E21C *35/20*

U.S. Cl. 299—43 18 Claims





1. A mineral mining installation comprising a scraper-chain conveyor composed of individual channel sections arranged end-to-end; means defining upper and lower chain guide passages at one side of the conveyor remote from a mineral face being worked; said passage-defining means including detachable covers fitted to the channel sections of the conveyor; at least some of the covers having lugs provided on the lower regions thereof; a floor sub-frame structure disposed beneath the conveyor; a mineral winning machine having a drive plate projecting between the conveyor and the sub-frame structure and slidable along the sub-frame structure; guide means in the lower guide passage connecting the drive plate to a drive chain running through the upper and lower passages; and connection means between said at least some of the covers and the sub-frame structure to permit both raising and tilting movements of the passage-defining means and adjacent sides of the channel sections of the conveyor to a limited extent in relation to the sub-frame structure in response to the passage of the drive plate; wherein the connection means takes the form of tongue-and-groove connections and locking bars are provided to maintain the tongues within the grooves, the locking bars being detachably connected to the sub-frame structure and having portions which overlap with the lugs on the lower regions of the covers.

4,715,660

VEHICLE DISC WHEEL WITH MULTIPLE TIRES ON ONE RIM

Jaroslaw V. M. Juhan, Geneva, Switzerland, assignor to JJD S.A., Geneva, Switzerland

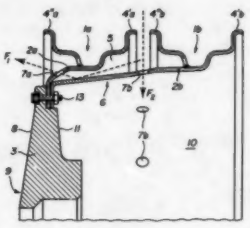
Continuation of Ser. No. 709,131, Mar. 7, 1985, abandoned. This application Feb. 2, 1987, Ser. No. 6,335

Claims priority, application Switzerland, Mar. 8, 1984, 1157/84

Int. Cl.[4] B60B *11/04, 11/06*

U.S. Cl. 301—13 R 3 Claims

1. Vehicle wheel comprising a lateral disc and a rim provided for mounting of at least two pneumatic tires, said rim comprising at least two distinct elements of different width, which are solidly connected on one side thereof to said lateral disc and the respective other sides of which are incurvated to form lateral walls of tire fitting rings and further incurvated lateral walls of tire fitting rings are solidly connected on the central parts of the rim elements, an annular passage opening between the incurvated lateral walls which are arranged to face each other, wherein said rim elements are coaxially arranged on one side of said lateral disc, the element having the



smaller width being placed in outer diametral position with respect to the element having the larger width.

4,715,661

HYDRAULIC BRAKE BOOSTER

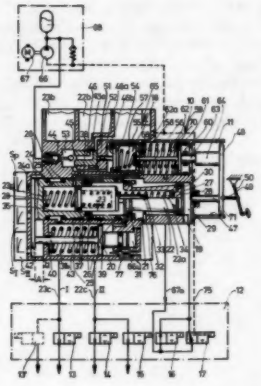
Heinz Leiber, Oberriexingen, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Jan. 13, 1986, Ser. No. 818,522

Claims priority, application Fed. Rep. of Germany, Mar. 1, 1985, 3507186

Int. Cl.[4] B60T *13/14*

U.S. Cl. 303—10 22 Claims



1. A hydraulic brake booster for a vehicle brake system, comprising a pressure medium supply system including a motor, a pump and a reservoir, a housing, a brake pedal, a brake pedal-actuated brake valve in said housing for connecting the pressure medium supply system with at least one master brake cylinder piston for at least one brake circuit, at least two master brake cylinder pistons disposed axially in line with one another with a portion of one piston disposed inside the other and disposed in said housing and a brake pedal locking piston beside said master brake cylinder pistons in said housing with its longitudinal axis in parallel relationship with said two master brake cylinder pistons and activated by said brake pedal via a brake pressure plate (48) connected to said brake pedal which actuates said brake pedal locking piston via tappet (63) and widened portion (64).

4,715,662

METHOD FOR DETERMINING AN OPTIMAL SLIP VALUE

Anton van Zanten, Ditzingen, and Gerhard Heess, Tamm, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

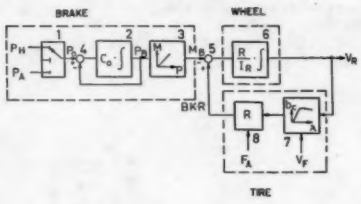
PCT No. PCT/EP84/00402, § 371 Date Aug. 16, 1985, § 102(e) Date Aug. 16, 1985, PCT Pub. No. WO85/02592, PCT Pub. Date Jun. 20, 1985

PCT Filed Dec. 15, 1984, Ser. No. 768,097

Claims priority, application Fed. Rep. of Germany, Dec. 16, 1983, 3345546

Int. Cl.[4] B60T 8/32

U.S. Cl. 303—109 13 Claims



1. A method for determining an optimal slip value λ at at least one wheel of a vehicle for regulating braking force, using signals (V_R*; V_F) at least approximated to the wheel speed V_R and the vehicle speed V_F, characterized in that the method comprises during driving, varying the slip value λ by varying the braking pressure P_B and at individual measuring instants (K, K+1 . . .) and ascertaining signal value combinations V_R*(K), V_F*(K), P_B*(K) and F_A*(K), that after inserting a plurality of these ascertained signal value combinations for various values of slip value λ into a function $V_R(K+1)=f$ with unknown estimated coefficients α_n, solving the resultant equation system and ascertaining the coefficients α_n, ascertaining coefficients a_n which are coefficients of a generalized description of a μ slip curve $\mu=f(V_R, V_F)$ from the coefficients α_n, and ascertaining a location of the optimal slip value λ_{opt} by use of the ascertained instantaneous course of the μ slip curve, where $p_B(K)$ is the braking pressure, $F_A(K)$ is the tire/road contact force and K is an increment counter, which defines the measurement and calculation instances which are located at intervals of ΔT from one another, and obtaining function $V_R(K+1)$ by the following two expressions:

$$V_R(K+1) = \alpha'_1 V_R(K) + \alpha'_2 \cdot F_A(K) \cdot \frac{V_F(K) - V_R(K)}{V_R(K)} \cdot \Delta T + \alpha'_3 P_B(K) \frac{R \cdot \Delta T}{I_R} \quad \bar{s} < 0{,}5$$

$$V_R(K+1) = \alpha_1 \cdot V_R(K) + [\alpha_2 + \alpha_3 (V_F(K) - V_R(K))] \cdot F_A(K)\Delta T + \alpha_4 \frac{V_R(K) \cdot F_A(K) \cdot \Delta T}{V_F(K) - V_R(K)} + \alpha_5 P_B(K) \frac{R \Delta T}{I_R}$$

for $\bar{s}>0.5$, where α'_1 and α'_2 and α_1–α_5 are the coefficients α_n that are to be ascertained, R is the radius of the wheel, IR is its moment of inertia,

$$\bar{s} = \frac{\epsilon\lambda}{\mu(1-\lambda)},$$

ϵ is a tire constant, $\mu=\mu_o(1+A\lambda.\nu\lambda)$, μ_o is the coefficient of friction between the tire and the road, $A\lambda$ is a rubber constant and $\nu\lambda=\lambda.V_F$.

4,715,663

BRAKE OIL PRESSURE CONTROL DEVICE

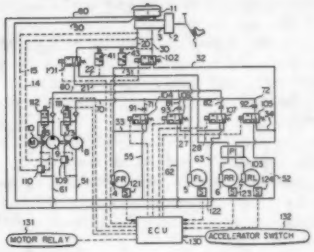
Yoshiyuki Hattori, Toyoake; Kazuma Matsui, Toyohashi; Yuichi Imani, Hamamatsu; Akira Kuno, Obu; Tetsuya Nagata, Konan; Koji Nakane, Anjo, and Ken Nomura, Okazaki, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Continuation-in-part of Ser. No. 792,007, Oct. 28, 1985, Pat. No. 4,627,671, and Ser. No. 793,760, Nov. 1, 1985, Pat. No. 4,687,260. This application Sep. 17, 1986, Ser. No. 908,234

Claims priority, application Japan, Sep. 23, 1985, 60-210846; May 7, 1986, 61-104457

Int. Cl.[4] B60T 8/86

U.S. Cl. 303—110 9 Claims



1. A brake oil pressure control device of a brake system for reducing a speed of wheels of a vehicle, said brake system including a brake pedal, a master cylinder connected to said brake pedal, a reservoir holding brake oil, and wheel cylinders, said device comprising;

a main line system having a main line connecting said master cylinder to said wheel cylinders, and a first valve provided between said master cylinder and said wheel cylinders to open and close said main line,

a subline system having a pressure source, a subline connecting said pressure source to said wheel cylinders, and a second valve provided between said pressure source and said wheel cylinders to open and close said subline,

a means for controlling an oil pressure at said pressure source, said controlling means having a relief pipe connecting a discharge port of said pressure source to said reservoir, a relief valve provided in said relief pipe, said relief valve opening said relief pipe in accordance with an oil pressure at said master cylinder so that the oil pressure at said pressure source is restricted to be not higher than the oil pressure at said master cylinder, and a third valve provided in said relief pipe to open and close said relief pipe,

a means for sensing a locking and slipping condition of said wheels, and

a valve control mechanism controlling said first, second and third valves in accordance with a locking and slipping condition of said wheels.

4,715,664

HYDRAULIC ANTI-SKID BRAKE SYSTEM WITH DEVICE FOR IMPROVEMENT IN STRAIGHT-LINE RUNNING STABILITY OF VEHICLE

Nobuyasu Nakanishi; Masakazu Ishikawa, both of Toyota; Akira Shirai, Toyoake, and Noboru Noguchi, Toyota, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan

Filed Mar. 20, 1986, Ser. No. 841,783

Claims priority, application Japan, Mar. 23, 1985, 60-59074

Int. Cl.[4] B60T 8/42

U.S. Cl. 303—111 9 Claims

1. A hydraulic brake system wherein braking pressures in respective right and left brake cylinders for a right wheel and a left wheel of a motor vehicle are regulated to prevent skidding, comprising:

a master cylinder operable for generating a master cylinder pressure;

a first passage and a second passage, said first and second passages connecting said master cylinder to said right and left brake cylinders, respectively;

a first pressure control device and a second pressure control device, said first and second pressure control devices being of a closed-circuit type, each of said first and second pressure control devices comprising:

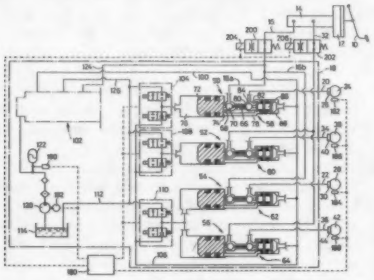
(a) a cut-off valve disposed in a part of each of said first and second passages, said cut-off valve being operable between an open position and a closed position;

(b) a variable-volume chamber communicating with a respective one of said first and second passages, at a point between said cut-off valve and a respective one of said first and second brake cylinders;

(c) an actuator partially defining said variable-volume chamber, said actuator being movable so as to selectively open and close said cut-off valve and sod as to change the volume of said variable-volume chamber thereby changing the braking pressure in said one of said right and left brake cylinders while said cut-off valve is placed in said closed position;

(d) a pressure chamber partially defined by said actuator such that pressure in said pressure chamber acts on said actuator so as to reduce the volume of said variable-volume chamber;

(e) a solenoid-operated valve connected to said pressure



chamber, said solenoid operated valve being operable between a first position wherein the pressure in said pressure chamber may be reduced, and a second position wherein the pressure in said pressure chamber may increase; and

(f) a power source independent of said master cylinder to activate said actuator through said solenoid-operated valve;

a first flow restrictor device provided in said first passage, a second flow restrictor device provided in said second passage, said first and second flow restrictor devices being electrically controlled independently of each other, so as to restrict the flow of a brake fluid from said master cylinder to said right and left brake cylinders through said first and second passages, respectively, and

control means electrically connected to said solenoid-operated valves of said first and second pressure control devices and to said first and second flow restrictor devices, said control means being operable to activate one of said first and second flow restrictor devices which corresponds to one of said right and left brake cylinders, after the pressure control device for the other brake cylinder is activated to start an anti-skid control of the braking pressure in the other one of said right and left brake cylinder upon skidding of the corresponding wheel, said control means controlling said one flow restrictor device to thereby reduce the rate of increase in the braking pressure in said one brake cylinder after said anti-skid control of the braking pressure in said other brake cylinder is started.

4,715,665

BRAKE SLIP CONTROLLED BRAKE FOR AUTOMOTIVE VEHICLES

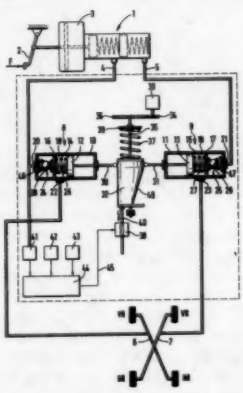
Fritz Ostwald, Dreieich, Fed. Rep. of Germany, assignor to ITT Industries, Inc., New York, N.Y.

Continuation of Ser. No. 640,684, Aug. 13, 1984, abandoned. This application Aug. 4, 1986, Ser. No. 894,450

Claims priority, application Fed. Rep. of Germany, Aug. 24, 1983, 3330483

Int. Cl.[4] B60T *15/58, 8/64, 8/42*

U.S. Cl. 303—111 **6 Claims**



1. A brake-slip-controlled brake system for an automotive vehicle including a master cylinder acted upon by a pedal force of the vehicle brake and said master cylinder being connected to a plurality of wheel brake cylinders respectively by way of a plurality of brake circuits, said system comprising, in combination:

a plurality of sensors respectively coupled to said vehicle for providing electrical signals indicative of vehicle braking behavior;

means coupled to said sensors for providing an output signal indicative of said braking behavior;

an axially displaceable rotating cam being rotatable about a given axis and longitudinally displaceable from a normal position of rest to a plurality of positions along said axis in response to said output signal, said cam being longitudinally tapered along said axis and having an eccentric cross section which varies in shape along said axis;

said cam including one axially extending portion throughout the entire length of said cam and which has a constant predetermined radial distance from said axis to thereby provide a high lobe substantially parallel to said axis;

means responsive to said output signal for translating said cam along said axis; and

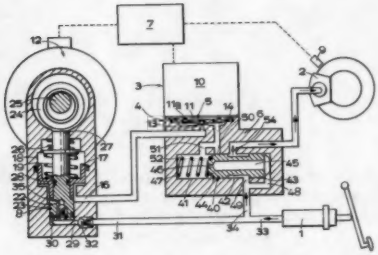
at least two braking pressure modulators each being respectively coupled to one of said brake circuits between said master cylinder and one of said brake cylinders, each of said modulators comprising a cylinder having a movable piston slidably mounted therein and each of said pistons having a tappet extending outwardly away from its cylinder for engaging said cam, and valve opening means extending in the opposite direction from said piston.

4,715,666

HYDRAULIC ANTI-SKID BRAKING SYSTEMS FOR VEHICLES

Glyn P. R. Farr, Warwickshire, England, assignor to Lucas Industries public limited Company, Great Britain

Filed May 14, 1986, Ser. No. 863,137
Claims priority, application United Kingdom, May 18, 1985, 8512610
Int. Cl.[4] B60T 8/40
U.S. Cl. 303—116 14 Claims



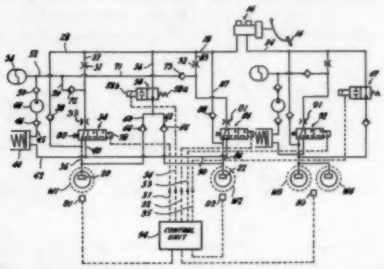
1. An hydraulic anti-skid braking system for a vehicle having a wheel, and comprising a brake for braking said wheel, a source of operating fluid for applying said brake, pressure-responsive means, sensing means for sensing the speed of rotation of said wheel and for emitting a signal when said speed or rotation exceeds a predetermined value, a modulator assembly for modulating the supply of operating fluid to said brake from said source in accordance with said signals from said sensing means, said modulator assembly incorporating means responsive to one of said signals to isolate said source from said brake and relieve the pressure of said operating fluid applied to said brake and, at the termination of said signal, to control re-application of said brake at a controlled rate, wherein said modulator assembly incorporates at least one flow-control regulator valve, and at least one exhaust valve, said flow-control regulator valve comprising a wall defining a bore, a metering spool which works in said bore and incorporates a fixed orifice, a spring biassing said spool, said spool being movable between a first position in which it is biassed by said spring to provide unrestricted direct communication of hydraulic fluid to said pressure-responsive means and a second position in opposition to the force in said spring and in which direct communication to said pressure-responsive means is cut-off and a variable orifice defined between said spool and said bore provides an indirect restricted communication of hydraulic fluid to said pressure-responsive means through said fixed orifice in said spool, a pressure drop across said fixed orifice determining the said second position, said exhaust valve being responsive to said signals and being movable between a closed position, when no signal is operative and said spool is biassed by said spring into the said first position, and an open position, when a signal is operative, to establish the said pressure drop whereby to cause said spool to move into the said second position.

4,715,667

HYDRAULIC PRESSURE CONTROL DEVICE FOR USE IN VEHICLE ANTI-SKID BRAKING SYSTEM

Hiromi Otsuki, Anjo; Kenichi Numata, Chiryu; Ryoichi Matsuura, Anjo; Yoshihisa Nomura; Nobuyasu Nakanishi, both of Toyota, and Hiroyuki Oka, Susono, all of Japan, assignors to Nippondenso Co., Ltd., Kariya and Toyota Jidosha Kabushiki Kaisha, Toyota, both of, Japan

Continuation-in-part of Ser. No. 760,982, Jul. 31, 1985, abandoned. This application Jun. 6, 1986, Ser. No. 873,272
Claims priority, application Japan, Aug. 9, 1984, 59-167628
Int. Cl.[4] B60T 8/00/8/36, 13/68, 15/02
U.S. Cl. 303—119 6 Claims



1. A hydraulic pressure control device in a vehicle anti-skid braking system, comprising:

(a) a brake master cylinder;

(b) a wheel brake actuating cylinder;

(c) a fluid pressure supply passage connected between said master cylinder and said wheel brake actuating cylinder for supplying a braking fluid under pressure from said master cylinder to said wheel brake actuating cylinder;

(d) control means responsive to a wheel condition, for generating a control signal;

(e) a directional control valve disposed in said fluid pressure supply passage and having at least first and second selective positions, said directional control valve being normally shifted to said first position to open said fluid pressure supply passage;

(f) a fluid pressure return passage connected between said directional control valve and said fluid pressure supply passage in bypassing relation to said directional control valve, said directional control valve being actuatable in response to said control signal for connecting said wheel brake actuating cylinder to said fluid pressure return passage to return a braking fluid under pressure from said wheel brake actuating cylinder to said fluid pressure supply passage in bypassing relation to said directional control valve;

(g) a reservoir disposed in said fluid pressure return passage for storing the braking fluid;

(h) a hydraulic pressure pump disposed in said fluid pressure return passage for pumping the braking fluid from said reservoir;

(i) an accumulator disposed in said fluid pressure return passage for storing part of the braking fluid from said hydraulic pump;

(j) a first restriction disposed in said fluid pressure supply passage between said master cylinder and the junction between said fluid pressure supply and return passages;

(k) a second restriction disposed in said fluid pressure supply passage between said directional control valve and the junction between said fluid pressure supply and return passages, said first restriction having a diameter smaller than the diameter of said second restriction; and

(l) a check valve disposed in said fluid pressure return passage for allowing the braking fluid to flow in one direction

only, said direction being from said accumulator into said fluid pressure supply passage.

4,715,668

PNEUMATIC MATTRESS TRACK SYSTEM FOR VEHICLES

Fredrik K. Burmeister, Lansantorppa 3, SF-02630 Espoo 63, Finland

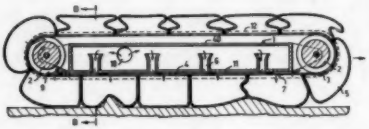
PCT No. PCT/FI84/00075, § 371 Date Apr. 17, 1985, § 102(e) Date Apr. 17, 1985, PCT Pub. No. WO85/01710, PCT Pub. Date Apr. 25, 1985

PCT Filed Oct. 15, 1984, Ser. No. 725,791

Claims priority, application Finland, Oct. 19, 1983, 833810

Int. Cl.[4] B62D *55/26*

U.S. Cl. 305—34 **8 Claims**



1. A pneumatic mattress track system used as a construction element of a vehicle, comprising a hull, front and rear roller means, endless, hollow mattress means running around said roller means, said mattress means having a plurality of discrete bag arrangements, each bag arrangement having a band surface facing the hull during entire operation of the system, the band surface having at least one opening for feeding a pressurized gas into the bag arrangement, a gas cushion space being defined between the hull and the band surfaces of the plurality of bag arrangements, the gas cushion space having a substantially thin configuration to enable to use a bottom of the hull and the band surfaces as the only sealing means for the gas cushion space, the gas being fed into the gas cushion space through a plurality of orifices in the bottom of the hull, a number of the orifices being at least equal to a number of the bag arrangements upon which the system rests during the operation.

4,715,669

CARTRIDGE CABINET DRAWER

William R. Baillie, Corona; Jorge Macias, West Covina, and Michael Dressendorfer, San Dimas, all of Calif., assignors to Russ Bassett Company, Whittier, Calif.

Filed Jun. 27, 1986, Ser. No. 879,416

Int. Cl.[4] A47B *81/06*

U.S. Cl. 312—12 **3 Claims**

1. A cabinet drawer for releasably storing a plurality of items of substantially identical height, comprising:

a front panel;

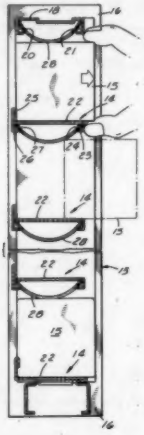
a back panel spaced apart from said front panel;

a top wall having one end secured to front panel and the opposite end secured to the back panel, said wall including a pair of inwardly facing spaced apart recesses on a lower surface;

a shelf panel having first and second opposite ends affixed to the respective front and back panels below the top wall a distance greater than the height of the items, said shelf panel having a width less than that of the items;

said shelf panel having an upstanding wall along one edge forming a partially enclosed back wall for the shelf panel the opposite side being open forming an access opening through which items are added to and removed from the drawer; and

a flat sheet of deformable spring-like material having a width greater than the distance between the top wall recesses, said flat sheet having opposite edges received within the respective recesses effecting bowing of the sheet downwardly toward the shelf panel a sufficient amount to resiliently engage the top of an item located therein;



said flat sheet having a plurality of parallel transverse spaced apart slots therein forming between each adjacent pair of slots an individual resiliently deformable member.

4,715,670

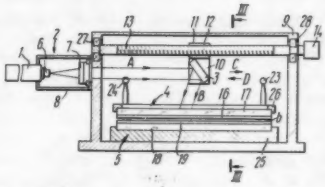
APPARATUS FOR COPYING HOLOGRAPHIC DIFFRACTION GRATINGS

Boris G. Turukhano, ulitsa K.Podryadchikova, 16, kv. 37, Leningradskaya oblast, Gatchina, U.S.S.R.

Filed Jul. 14, 1986, Ser. No. 885,099

Int. Cl.[4] G03H *1/20*

U.S. Cl. 350—3.69 **2 Claims**



1. An apparatus for copying holographic diffraction gratings, comprising:

a source of coherent radiation, which emits coherent radiation;

a collimating system placed directly after said coherent radiation source in the direction of said radiation;

a mirror placed directly after said collimating system in the direction of said coherent radiation and adapted for reciprocal travel;

a master holographic diffraction grating placed directly after said mirror in the direction of said coherent radiation and comprising a substrate having a first extended surface along which said travel of said mirror is performed so that said coherent radiation reflected by said mirror falls on said first extended surface and a second extended surface, and a recording layer applied on the second extended surface;

a copy holographic grating placed directly after said master holographic grating in the direction of said coherent radiation, rigidly secured to said master holographic grating and comprising a substrate having a first extended surface

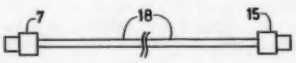
facing said recording layer of said master holographic grating, a second extended surface, and a recording layer applied on the first extended surface.

4,715,671

OPTICAL TRANSMISSION LINK FOR MUSICAL PRODUCTION

Edward J. Miesak, #2A 2508 W. Hickory, Denton, Tex. 76201

Filed Jun. 10, 1985, Ser. No. 743,008
Int. Cl.[4] G02B 6/00; G10H 1/00
U.S. Cl. 350—96.10 15 Claims



1. A shock eliminating audio signal transmission link for use by performing musicians, comprising

a musical instrument,

a first standard audio connector for connection to said musical instrument, said connector having a first electrical contact,

source electro-optical transducing means in electrical communication with said first contact at a source location for transducing a sound electrical signal received at said contact into a corresponding light signal,

a second standard audio connector having a second electrical contact,

receiving electro-optical transducing means in electrical communication with said contact at a receiving location remote from said source location for converting said light signal into a corresponding received sound electrical signal and delivering the same to said second contact, and

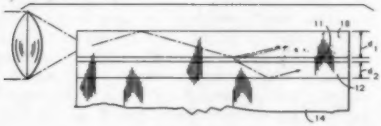
means for transmitting said light signal between said source and receiving electro-optical transducing means.

4,715,672

OPTICAL WAVEGUIDE UTILIZING AN ANTIRESONANT LAYERED STRUCTURE

Michel A. Duguay, Fair Haven; Thomas L. Koch, Middletown, both of N.J.; Yasuo Kokubun, Yokohama, Japan, and Loren N. Pfeiffer, Morristown, N.J., assignors to American Telephone and Telegraph Company, Murray Hill, N.J.

Filed Jan. 6, 1986, Ser. No. 816,199
Int. Cl.[4] G02B 6/10
U.S. Cl. 350—96.12 7 Claims



1. An optical waveguide comprising first optical material structured with boundaries to guide light of a selected wavelength in a predetermined direction, and means juxtaposed with said boundaries for establishing an antiresonant reflection for a component of light propagating in a direction perpendicular to said predetermined direction including a second optical material of predetermined thickness adjacent to said first optical material and having an index of refraction greater than that of said first optical material, and a third optical material adjacent to said second optical material and having an index of refraction less than that of said second optical material, said predetermined thickness of said second optical material is approximately equal to an odd multiple of one-quarter wavelength of light in said second optical material, characterized in that,

said first optical material is fabricated as a planar waveguide having a thickness d_1, and said third optical material is fabricated as a layer having a thickness d_2 which is approximately equal to an odd multiple times one-half of the thickness d_1.

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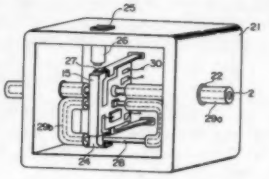
OPTICAL SWITCH

Takanobu Noro, Yokohama; Yasumasa Koakutsu, Fujisawa; Tamio Takeuchi; Masao Yano, both of Yokohama; Seiichi Onoda, Tokorozawa; Hideo Arima, Yohohama; Hitoshi Yokono, Fujisawa, and Hirayoshi Tanei, Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed May 1, 1986, Ser. No. 857,957
Int. Cl.[4] G02B 6/36
U.S. Cl. 350—96.20 12 Claims



1. An optical switch comprising:

first and second light path members disposed to confront each other;

a substrate located between said first and second light path members;

an optical waveguide fitted in said substrate substantially in parallel to a line connecting said first and second light path members;

a light emitting element fixed in proximity to said optical waveguide on one side of said substrate, said light emitting element being in optical coupling with said first light path member;

a photosensitive element fixed oppositely to said light emitting element on another side of said substrate, said photosensitive element being in optical coupling with said second light path member;

a drive means for moving said substrate at least between two positions so that said optical waveguide or said elements are positioned between said first and second light path members; and

a looping light path member for coupling said light emitting element with said photosensitive element optically when said optical waveguide is positioned between said first and second light path members.

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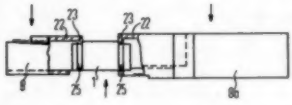
LIGHT-WAVE GUIDE-PLUG CONNECTION

Dietmar Schulz, Munich; Peter Pohl, Stockdorf, both of Fed. Rep. of Germany, and Alfred H. Johnson, Poughkeepsie, N.Y., assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany and IBM, Armonk, N.Y.

Filed Jan. 20, 1987, Ser. No. 5,053
Int. Cl.[4] G02B 6/38
U.S. Cl. 350—96.21 3 Claims



1. A light wave guide-plug connection with plug connector halves in which the forward ends have at least a pin, or sleeve shaped plug element, comprising:

a plug connector half with a sleeve shaped plug element

formed for connection with a pin shaped plug element joinable with a first of two supporting bodies the first body including an entrance channel for inserting said plug-connector half with at least one pin shaped plug element such that a joined position of the plug connector half with the sleeve shaped plug element and the first supporting body is obtained through tenon-groove-interlock contours of the plug connector half with the sleeve shaped plug element and the first supporting body lying crosswise to a plug axis, and a motion of the plug connector half with the sleeve shaped plug element and the first supporting body crosswise to the plug axis;

a second supporting body having a guiding tube for the insertion of pin shaped plug elements from both sides, and having at said both sides interlock contours of like configuration as the interlock contours of the plug connector half with said sleeve shaped plug element.

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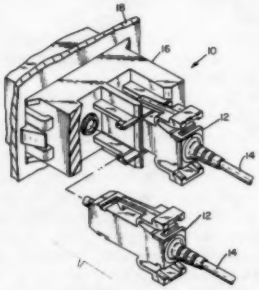
FIBER OPTIC FERRULE

James D. Kevern, Wellsville; William J. Stape, Lewisberry, and Robert N. Weber, Hummelstown, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Continuation of Ser. No. 631,413, Jul. 16, 1984, abandoned. This application Jan. 21, 1987, Ser. No. 6,344

Int. Cl.[4] G02B 6/36

U.S. Cl. 350—96.20 **4 Claims**



1. A ferrule for permanent connection to an optical fiber cable and for assembly into an optical connector assembly, the ferrule comprising,

opposing first and second identical ferrule halves construdted to engage and mate with each other,

a mating surface on each corresponding ferrule half,

a portion of a mating face at one end of said mating surface, a mating face constructed by said portions of a mating face for encircling an end of an optical fiber portion of an optical fiber cable,

an optical fiber receiving groove extending along said mating surface and communicating with said portion of said mating face,

a jacket portion receiving reces extending along said mating surface and communicating with said groove and with a rear end of a corresponding ferrule half,

interengaging alignment means extending transversely of said mating surface for aligning and interengaging the opposing ferrule half,

means for securing said ferrule halves together with the ferrule halves opposed along their mating surfaces with the recited grooves opposed and aligning an optical fiber portion of an optical fiber cable axially of the ferrule and with an end of the optical fiber at the mating face, and with the recesses opposed and receiving a jacket portion of an optical fiber cable,

the ferrule having an exterior mounting means defined by the opposed first and second ferrule halves for mounting the ferrule within a connector assembly,

on each ferrule half a projecting portion of the mounting means projects above the mating surface, on each ferrule half another portion of the mounting means is recessed below the mating surface,

a recess in the mating surface aligned with said another portion of the mounting means and aligned with the projecting portion of the mounting means across the mating surface from the projecting portion of the mounting means and receives therein the corresponding projecting portion of the opposed ferrule half, and

projection means projecting in said recess of each ferrule half for engaging and gripping a jacket portion of an optical fiber cable received in said recess.

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OPTICAL FIBER CABLE

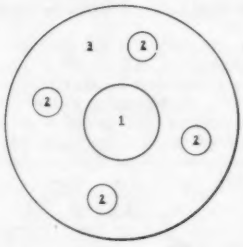
Ralph Sutehall, and Robert S. F. Clarke, both of Harlow, England, assignors to STC plc, London, England

Filed Nov. 5, 1985, Ser. No. 795,182

Claims priority, application United Kingdom, Nov. 10, 1984, 8428480

Int. Cl.[4] G02B 6/44

U.S. Cl. 350—96.23 **6 Claims**



1. A gas blocked optical fiber cable having an extruded sheath in which is embedded a central strength member that is longitudinally impermeable to gas, and also embedded in the extruded sheath, around the strength member, a set of plastics packaged glass optical fibers spaced apart from each other and from the strength member;

wherein each member of the set of packaged fibers consists of a glass optical fiber posessing an optical waveguiding structure within the glass, which glass is provided with primary and secondary plastics coatings respectively of lower tensile modulus material that is not degraded at the extrusion temperature of the sheath material, and of higher modulus material that has a Vicat softening temperature higher than the extrusion temperature of the sheath material;

and wherein the extruded sheath is a pressure extruded sheath annealed to produce shrinkage, and is made of material having a tensile modulus of at least 700 MPa.

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RUGGEDIZED OPTICAL FIBER CABLE

Yasunori Saito, Cary, and John DeAngeles, Durham, both of N.C., assignors to Sumitomo Electric Research Triangle, Inc., Research Triangle Park, N.C.

Filed Dec. 24, 1985, Ser. No. 812,973

Int. Cl.[4] G02B 6/44

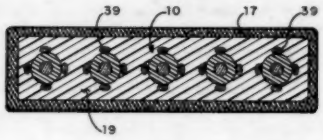
U.S. Cl. 350—96.23 **22 Claims**

1. A high strength flat optical fiber cable comprising:

a plurality of plastic coated optical fibers in parallel relationship; and

an outer jacket surrounding said plurality of optical fibers, said outer jacket comprising a set resin having a plurality

of fiber reinforcement elements positioned thoughout the set resin and extending generally parallel to said optical fibers with a high strength fiber reinforced resin jacket



wherein said fiber reinforcement elements comprise a plurality of monofilament yarns selected from the group comprising glass, KEVLER, carbon and graphite yarns.

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OPTICAL FIBRE CABLE

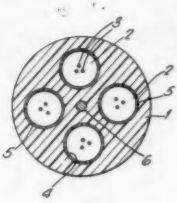
Oliver S. Johnson, Kent, and Robert J. W. Powell, Middlesex, both of England, assignors to Telephone Cables Limited, England

Filed Nov. 8, 1984, Ser. No. 669,580

Claims priority, application United Kingdom, Nov. 16, 1983, 8330621

Int. Cl.[4] G02B 6/44

U.S. Cl. 350—96.23 **10 Claims**



1. An optical fibre cable comprising: a sheath having at least one channel extending along the sheath, at least one optical fibre contained within said at least one channel and, means located within and distributed along the sheath, for catalyzing the oxidation of hydrogen within the cable to water, said means including a quantity of hydrogen trapping material together with at least one of a waterblocking and a water-absorbing substance.

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LOW DISPERSION, LOW-LOSS SINGLE-MODE OPTICAL WAVEGUIDE

Venkata A. Bhagavatula, Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Continuation of Ser. No. 496,560, May 20, 1983, abandoned, which is a continuation-in-part of Ser. No. 328,369, Dec. 7, 1981, abandoned. This application Feb. 2, 1987, Ser. No. 9,820

Int. Cl.[4] G02B 6/22

U.S. Cl. 350—96.33 **30 Claims**

15. A single-mode optical waveguide fiber comprising

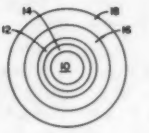
a core of transparent material having a maximum refractive index n_1 and a radius a, and

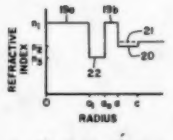
a layer of transparent cladding material on the outer surface of said core, the refractive index n_2 of said cladding being less than n_1,

said waveguide being characterized in that said core includes at least one annular region of depressed refractive index, the inner radius a_i of the innermost of said regions being greater than zero and the maximum radius a_o of the outermost of said regions of depressed refractive index being less than a, the refractive index profile of said single-mode fiber being such that:

(a) said fiber is relatively free from microbending loss, and

(b) said fiber exhibits a waveguide dispersion characteristic which is such that:





(1) waveguide dispersion is relatively uniform with respect to wavelength so that the fiber is insensitive to manufacturing tolerances and

(2) waveguide dispersion is relatively large at wavelengths greater than 1400 nm so that large values of material dispersion can be completely cancelled.

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OPTICAL SWITCH

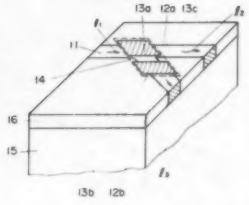
Takao Kawaguchi, Moriguchi; Hideaki Adachi, Hirakata; Kentaro Setsune, Sakai; Kenzo Ohji, Ikoma, and Kiyotaka Wasa, Nara, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

PCT No. PCT/JP84/00039, § 371 Date Oct. 5, 1984, § 102(e) Date Oct. 5, 1984, PCT Pub. No. WO84/03155, PCT Pub. Date Aug. 16, 1984

PCT Filed Feb. 10, 1984, Ser. No. 667,480

Int. Cl.[4] G02B 6/00

U.S. Cl. 350—96.34 **18 Claims**



1. An optical switch of the type including at least

an input optical wave guide;

two branch optical wave guides;

a pair of transmission control electrodes and a branch portion at which said input optical wave guide is branched into said branch optical wave guides, said input optical wave guide and said branch optical wave guides being made of electro-optical material and said transmission control electrodes being arranged in a spaced relation with a gap having a predetermined width therebetween, said gap being located at any one of the input optical wave guides and the branch optical wave guides in the vicinity of said branch portion so that transmission of light beams through the input optical wave guide and the branch optical wave guide is controlled by applying a predetermined voltage to the transmission control electrodes

thereby changing the refractive index of the optical wave guide at the position located below said gap, wherein the input optical wave guide and the branch optical wave guide are constituted by a layer of a PLZT ((Pb, La) (Zr, Ti) O_3) based thin film which is formed by epitaxial growth on the base plate located on a C-plane of sapphire (α-alumina).

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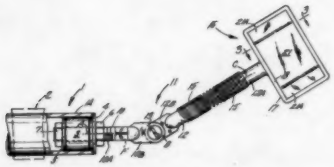
BICYCLE REFLECTOR FOR HANDLEBAR ATTACHMENT

William M. Johnson, P.O. Box 70404, Eugene, Oreg. 97401

Filed Mar. 3, 1986, Ser. No. 835,371
Int. Cl.[4] G02B *5/08, 7/18*
U.S. Cl. 350—99 **5 Claims**



1. A reflector asssembly for inserted attachment to a tubular structure of a vehicle, sasid assembly comprising,

expandable mounting means including a plug of elastomeric material, adjustable means acting on said plug to radially expand same when positioned within the tubular structure to secure same therein,

articulated arm means including a threaded arm segment extending through said plug and on which said adjustable means are carried for acting on said plug, and a reflector carried by said arm means and offset from said plug.

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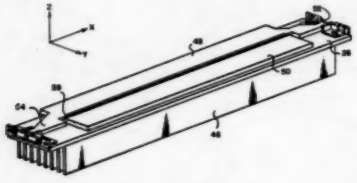
MOUNT FOR IMAGING LENS ARRAY ON OPTICAL PRINT HEAD

Kevin C. Koek; William T. Matthias, both of Rochester, and James T. Barton, Fairport, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jul. 11, 1986, Ser. No. 884,943
Int. Cl.[4] G02B *7/02, 6/04*
U.S. Cl. 350—253 **5 Claims**



1. Apparatus for mounting an imaging lens array formed of a plurality of gradient index optical fibers onto a print head having a linear array of light sources, such that the optical fibers are accurately spaced from the light sources in a first direction along their optical axes and are accuretely positioned in a second direction lateral to the length of the light source array so as to align with the light sources; said apparatus comprising:

first attachment means for totally constraining one end of the imaging lens array relative to the print head; and

second attachment means for constraining the other end of the imaging lens array to inhibit movement of the lens array in the first and second directions while permitting at least limited relative movement between said other end of the imaging lens array and the print head in a third direction along the length of the light source array to accommodate different rates of thermal expansion of the imaging lens array and of the print head.

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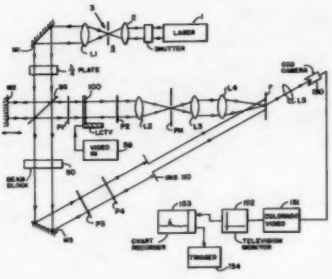
MODIFIED LIQUID CRYSTAL TELEVISION AS A SPATIAL LIGHT MODULATOR

Don A. Gregory, Huntsville, Ala., and Bob D. Guenther, Cary, N.C., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Nov. 10, 1986, Ser. No. 928,492
Int. Cl.[4] G02F *1/13;* G03H *1/08;* G02B *5/32*
U.S. Cl. 350—331 R **4 Claims**



1. A system comprising a laser producing a laser beam, first means for splitting said laser beam into first and second parts, a liquid crystal television having a screen, a lens, input means connected to said television so as to cause a scene to be depicted on said screen, said screen positioned such that the first part of said laser beam will pass through said screen and be modulated by the scene thereon, and be transformed by said lens, film means being positioned so as to receive said first part of said laser beam after it passes through said screen, and said second part of said laser beam being directed towards said film means by a path which does not pass through said TV screen so as to act as a reference beam, whereby said film means will produce a holograph of said scene on said TV screen.

4,715,684

OPTICAL SYSTEM FOR THREE COLOR LIQUID CRYSTAL LIGHT VALVE IMAGE PROJECTION SYSTEM

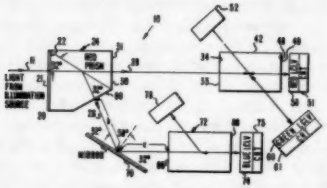
Ralph J. Gagnon, Chico, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Jun. 20, 1984, Ser. No. 622,528
Int. Cl.[4] G02F *1/13;* G02B *27/14, 27/28, 21/00*
U.S. Cl. 350—331 R **20 Claims**

1. In a multi color projection system, having first means for providing a source of light energy, first, second and third liquid crystal light valves; first, second and third means for providing an optical signal for use in combination with said first, second and third liquid crystal light valves; and first and second projection lenses, the improvement comprising:

a first beam splitter for splitting light incident thereon into first and second beams, said first beam including first and second color components having said first polarization state and a first color component having a second polarization state; said second beam including said second color component and a third color component, both of said second and third color components having said second polarization state;

a second beam splitter mounted in the optical path of said first beam and oriented with respect to said first beam splitter, to reverse the polarization states of the light incident thereon and to direct the first color component of said first polarization state to said first light valve and



polarization modulated light from said first light valve to said first projection lens; said second beam splitter also directing the second color component of said second polarization state to said second light valve and polarization modulated light from said second light valve to said first projection lens; and

a third beam splitter responsive to said third color component and oriented with respect to said second beam for reversing the polarization state of said third color component and for directing said third color component having a first polarization state to said third light valve and polarization modulated light from said third light valve to said second projection lens.

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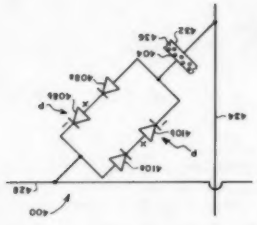
LIQUID CRYSTAL DISPLAY HAVING POTENTIAL SOURCE IN A DIODE RING

Zvi Yaniv, Southfield; Vincent D. Canella, Birmingham; Walter E. Chapelle, Southfield, and Roger W. Pryor, Bloomfield Hills, all of Mich., assignors to Energy Conversion Devices, Inc., Troy, Mich.

Filed Mar. 4, 1985, Ser. No. 708,355
Int. Cl.⁴ G02F 1/133
U.S. Cl. 350—332 **18 Claims**



1. A light influencing display comprising: a plurality of pixels, at least one pixel including a pair of electrodes, at least one of said electrodes being light transmissive; isolation means coupled to one of said electrodes to enable the selective application of driving potentials across said electrodes; and light influencing material disposed between said electrodes; said isolation means including bidirectional threshold means for establishing first and second threshold voltages of opposite polarity and including a first threshold device having a first threshold voltage, and a second threshold device having a second threshold voltage, said first and second threshold devices being coupled together in a ring to establish first and second threshold voltages of opposite polarity; and first and second photovoltaic potential sources coupled in series with said first and second threshold devices respectively, said first threshold device being in series with said first photovoltaic potential source in the ring and said second second threshold device being in series with said second photovoltaic potential source in the ring for back biasing said first and second threshold devices and increasing the absolute magnitude of said first and second threshold voltages.

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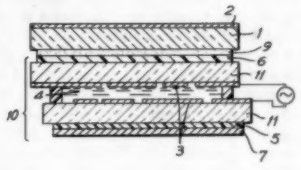
LIGHT-PASSIVE DISPLAY DEVICE AND METHOD OF MANUFACTURING SAME

Yukihiro Iwashita, and Hideaki Okumura, both of Shiojiri, Japan, assignors to Seiko Epson Corporation, Tokyo, Japan

Filed Nov. 14, 1985, Ser. No. 798,094
Claims priority, application Japan, Nov. 16, 1984, 59-241937; Nov. 28, 1984, 59-252575; Dec. 17, 1984, 59-265649
Int. Cl.⁴ G02F 1/133
U.S. Cl. 350—339 R **29 Claims**



1. A liquid crystal display device having at least one transparent substrate and improved optical properties due to a reduction in light reflected from the exterior surface of the at least one transparent substrate, comprising:

a polarizing plate disposed on the exterior surface of the at least one transparent substrate;

a transparent glass plate having an anti-reflection surface on the polarizing plate;

an adhesive layer provided on at least a portion of the interface between the polarizing plate and the glass plate on the side opposite the anti-reflection surface for causing the glass plate to adhere to the polarizing plate; and

wherein at least the at least one transparent substrate, the polarizing plate and the glass plate have substantially the same refractive index.

13. A method of producing a liquid crystal display assembly including a liquid crystal element having at least one transparent substrate, a polarizing plate provided on the exterior surface of the at least one transparent substrate and a transparent glass anti-reflection plate which adheres with optical uniformity on the polarizing plate, comprising:

adhering a polarizing plate to the exterior surface of the at least one transparent substrate;

placing a transparent adhesive film on at least a portion of the polarizing plate;

placing a transparent glass anti-reflection plate on the adhesive film to form an assembly;

heating the assembly; and

applying pressure to the assembly while it is heated.

4,715,687

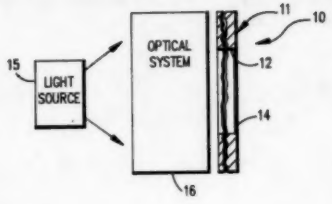
COLOR VARIATION IN A PASSIVELY ILLUMINATED DISPLAY USING FLUORESCENT LIGHT SOURCES

David W. Glass, Georgetown, and Wilson M. Routt, Jr., Lexington, both of Ky., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 23, 1986, Ser. No. 945,630

Int. Cl.[4] G02F *1/13*; F21K *2/00*; H01J *1/62*; H05B *37/00*

U.S. Cl. 350—345 **19 Claims**



1. A passively illuminated display including:

a plurality of switch means disposed in a desired arrangement;

light source means disposed to illuminate each of said switch means to enable each of said switch means to display light from said light source means when said switch means is in its selected state;

activating means to activate said light source means at rapid time intervals;

said light source means producing light of a first color during a first time period when said light source means is activated by said activating means and at least light of a second color during a second time period when said light source means is not activated by said activating means;

and means to selectively control each of said switch means to cause each of said switch means to be in the selected state for displaying light from said light source means during the first time period, the second time period, or to not be in the selected state during either of the time periods, each of said switch means displaying light of the first color if in the selected state during the first time period and displaying light of the second color if in the selected state during the second time period.

4,715,688

FERROELECTRIC LIQUID CRYSTAL DISPLAY DEVICE HAVING AN A.C. HOLDING VOLTAGE

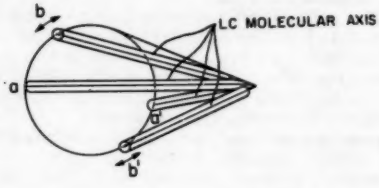
Takamasa Harada; Masaaki Tagushi, and Koji Iwasa, all of Tokyo, Japan, assignors to Seiko Instruments Inc., Tokyo, Japan

Filed Dec. 10, 1984, Ser. No. 679,760

Claims priority, application Japan, Jul. 4, 1984, 59-138832; Oct. 15, 1984, 59-215363

Int. Cl.[4] G02F *1/13*

U.S. Cl. 350—350 S **41 Claims**



1. A liquid crystal display device driven in a time-sharing mode, comprising: a pair of electrodes spaced apart from each other; a ferro-electric liquid crystal layer disposed between the pair of electrodes such that the layer loses a spiral molecular alignment thereof to establish two-bistable molecular alignments thereof; drive means connected between the pair of electrodes for applying an electric signal to the layer sufficient to change one of the two bi-stable molecular alignments to the other bi-stable molecular alignment and for applying an A.C. electric signal to the layer effective to hold the other bi-stable molecular alignment, the A.C. electric signal having an amplitude and a pulse width insufficient to change the bi-stable molecular alignments; and converting means for coverting the two bi-stable molecular alignments to corresponding optical ON and OFF display states, respectively.

23. A smectic liquid crystal display device comprising in combination: a liquid crystal panel including a pair of opposed base plates, electrodes disposed on the respective inner surfaces of the opposed base plates, alignment membranes shaped on the respective inner surfaces of the opposed base plates, and a smectic liquid crystal compound inserted between the opposed base plates at an interval less than a spiral pitch of the liquid crystal compound so that the liquid crystal compound is aligned by the alignment membranes to establish two bi-stable optical states; means for applying a liquid crystal operating voltage of one polarity in a first half of an electrode selecting operation to the electrodes so as to select one of the two bi-stable optical states and for applying another liquid crystal operating voltage of another polarity in a second half of the electrode selecting operation to the electrode so as to select the other bi-stable optical state, and means for applying to the electrodes an alternating voltage which is less than the liquid crystal operating voltage in a non-electrode selecting operation so as to hold the selected bi-stable optical state.

4,715,689

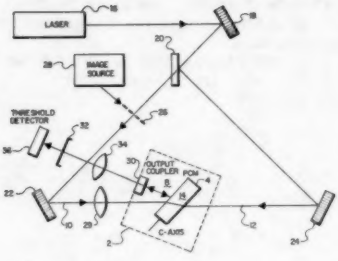
APPARATUS AND METHOD FOR SPATIAL INTENSITY THRESHOLD DETECTION

Thomas R. O'Meara, Malibu, and Richard C. Lind, Woodland Hills, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed May 20, 1986, Ser. No. 864,937

Int. Cl.[4] G02B *5/23*; G02F *1/01*

U.S. Cl. 350—354 **25 Claims**



1. A spatial optical intensity threshold detector, comprising:

a phase conjugate resonator (PCR) comprised of a phase conjugate mirror (PCM), a mirror means optically opposed to the PCM and an oscillation cavity between the PCM and mirror means, the PCR having a greater than unity gain,

means for applying an optical input beam having a spatial intensity pattern to the PCR, the beam cooperating with the PCR to produce a high intensity spatial PCR oscillation output at locations corresponding to the beam having optical intensities on one side of a threshold intensity level, and

an optical detector means positioned to sense the PCR oscillation pattern.

4,715,690
PHOTOGRAPHIC SCREEN

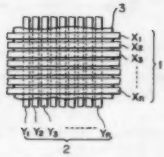
Kaoru Onodera; Satoru Hohnishi; Kazuyuki Kobayashi, and Kazuo Shiozawa, all of Hino, Japan, assignors to Konishiroku Photo Ind. Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 836,223, Feb. 28, 1986, abandoned, which is a continuation of Ser. No. 525,254, Aug. 19, 1983, abandoned, which is a continuation of Ser. No. 234,329, Feb. 13, 1981, abandoned. This application Dec. 31, 1986, Ser. No. 948,430

Claims priority, application Japan, Feb. 13, 1980, 55-15509

Int. Cl.[4] G02F *1/17*

U.S. Cl. 350—357 **15 Claims**



1. A light transmitting electrochromic optical screen for photographic use, said screen being arranged to pass light prior to the light exposing a photosensitive material, comprising:

an optically heterogenerous pattern consisting of regions of relatively higher light transmission density and regions of relatively lower light transmission density, and

means for variably defining predetermined areas on said screen as said regions of higher and lower light transmission density by varying at least one of:

(i) the area of both said higher and lower light transmission density regions, and

(ii) the transmission density of said region of relatively higher light transmission density,

to thereby vary the pattern of said relatively higher and lower light transmission density regions of said screen and thereby varying the light transmission characteristics of said screen.

4,715,691
ELECTROCHROMIC DISPLAY USING BIPOLAR ION-EXCHANGE MEMBRANE

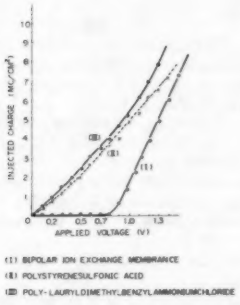
Toshikatsu Sata, Tokuyama; Teruaki Katsube, Tokyo, and Yoshiya Iida, Yokohama, all of Japan, assignors to Tokuyama Soda Kabushiki Kaisha, Yamaguchi, Japan

Filed Dec. 10, 1985, Ser. No. 807,250

Claims priority, application Japan, Dec. 12, 1984, 59-260858

Int. Cl.[4] G02F *1/23*

U.S. Cl. 350—357 **8 Claims**



1. An electrochromic display comprising a transparent electroconductive substrate as an electrode, an electrochromic layer, an ion-exchange membrane and a counter electrode in a laminated structure, said ion-exchange membrane being a bipolar ion-exchange membrane comprising at least one cation-exchange membrane layer having cation-exchange groups and at least one anion-exchange membrane layer having anion-exchange groups in a laminated structure.

4,715,692
VARIFOCAL TYPE FINDER

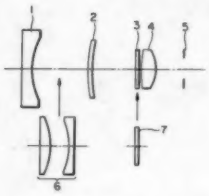
Yasuyuki Yamada, Tokyo; Kazuo Fujibayashi, Kanagawa; Yasuhisa Sato, Kanagawa, and Hideo Yokota, Kanagawa, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 24, 1984, Ser. No. 653,966

Claims priority, application Japan, Sep. 28, 1983, 58-149729[U]

Int. Cl.[4] G02B *15/02*; G03B *13/10*

U.S. Cl. 350—422 **6 Claims**



1. A finder of the variable magnification type comprising:

an objective lens; an eyepiece arranged in a spaced relation to said objective lens; an auxiliary lens for magnification change arranged to be inserted into and retracted from a space between the objective lens and the eyepiece; and means arranged in between the objective lens and the eyepiece to provide viewfield frames of different sizes when the auxiliary lens is inserted and retracted.

4,715,693
VARI-FOCAL PHOTOGRAPHIC LENS SYSTEM OF REAR LENS GROUP EXCHANGE TYPE

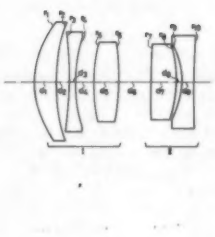
Hiroshi Takase; Masaki Imaizumi, and Toru Fujii, all of Tokyo, Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Feb. 12, 1985, Ser. No. 701,040

Claims priority, application Japan, Feb. 16, 1984, 59-26073

Int. Cl.[4] G02B *15/02, 9/34, 9/60*

U.S. Cl. 350—422 **4 Claims**



1. A vari-focal photographic lens system of rear lens group exchanging type comprising, in the order from the object side, a front lens group and a rear lens group, said front lens group consisting of a positive lens, a negative lens and a positive lens, having a positive refracting power as a whole, and being located more toward the object side position in the tele-position than the position in the wide position, said rear lens group

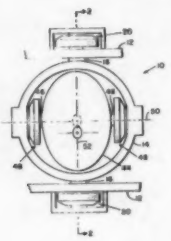
being arranged to be exchangeable in the tele-position and in the wide-position, and consisting of a positive lens and a negative lens in the wide position and consisting of a negative lens in the tele-position, said vari-focal photographic lens system being arranged to vary the focal length of the lens system as a whole by exchanging said rear lens group.

4,715,694

BEAM STEERING MIRROR CONSTRUCTION

Frederick G. Eitel, Palm Beach, Fla., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Apr. 28, 1986, Ser. No. 856,263
Int. Cl.[4] G02B *26/10*
U.S. Cl. 350—486 **3 Claims**



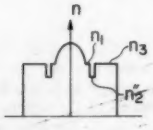
1. A beam steering mirror construction comprising a beam steering mirror with trunnion mounting shafts projecting from opposite sides thereof for rotation of the beam steering mirror about a primary axis through a centroid of the mirror, a ring structure surrounding said beam steering mirror and trunnion mounting said shafts of said beam steering mirror relative to said ring structure, said ring structure having trunnion mounting shafts projecting therefrom on a secondary axis that is 90° from the trunnion primary axis of said beam steering mirror and said secondary axis being located in the same plane as said primary axis, a set of trunnion bearings mounting said ring structure at said shafts relative to a stationary support structure, electric torque motor actuator means mounted relative to said beam steering mirror shafts and said ring structure for adjusting said beam steering mirror about said primary axis, an electric torque motor actuator means mounted between said trunnion mounting shafts of said ring structure and said stationary support structure for adjusting said ring structure about said secondary axis, and said trunnion mounting shafts of said ring structure and said trunnion mounting shafts of said beam steering mirror each having torsion spring means which spring bias these trunnion mounting shafts for rotary constraints by the torsion spring means.

4,715,695

FIBER FOR OPTICAL TRANSMISSION

Masayuki Nishimura; Shuzo Suzuki, and Hiroshi Yokoto, all of Kanagawa, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Apr. 11, 1984, Ser. No. 599,023
Claims priority, application Japan, Jun. 15, 1983, 58-107354
Int. Cl.[4] G02B *6/16*
U.S. Cl. 350—96.31 **3 Claims**



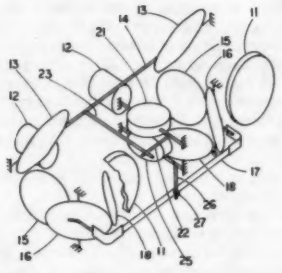
1. A fiber having only a single core for optical transmission, said core having a substantially parabolic distribution of refractive index for propagating light in a plurality of modes, said fiber further comprising: a first cladding layer formed around said core having a refractive index equal to that at a peripheral portion of said core, wherein the thickness of said first cladding layer is between D/100 and d/20, where D is the diameter of said core; a second cladding layer formed around said first cladding layer having a refractive index smaller than that of said first cladding layer; and a third cladding layer formed around said second cladding layer having a refractive index greater than that of said second cladding layer, wherein said core propagates all of said plurality of modes and said cladding layers affect retardation times of said plurality of modes propagating in said core.

4,715,696

FLEX COUPLINGS ISOLATE STABILIZING MIRRORS

Orville T. Greene, Jr., 1 Marla Ct., Stafford, Va. 22554, and John A. Mead, 506 Tree Top Dr., Apt. 102, Virginia Beach, Va. 23451

Filed Jul. 1, 1986, Ser. No. 881,113
Int. Cl.[4] G02B *27/64, 23/00*
U.S. Cl. 350—500 **7 Claims**



1. In an image stabilizing binocular with two pitch mirrors carried in line on a common bar whose outboard extremities are attached to the frame through pivot wires defining a pitch axis about which said mirrors compensate the line-of-sight for frame oscillation with rotation through a linkage by a relatively small single-degree-of-freedom gyroscope, the inclusion of spring ribbon couplings to connect said mirrors to said common bar; each said coupling, with its width parallel to pitch, being fastened to said common bar along its length near its middle and to the back side of one mirror near both its ends, leaving curled portions of its length free to isolate said mirrors from visible vibration.

4,715,697

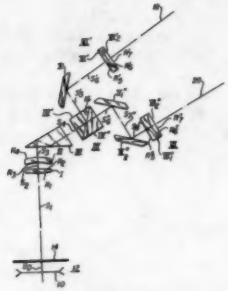
MICROSCOPE BODY SYSTEM

Puthenpurackal K. John, Pittsfold, and Arthur H. Shoemaker, Orchard Park, both of N.Y., assignors to Cambridge Instruments Inc., Buffalo, N.Y.

Filed Dec. 9, 1985, Ser. No. 806,878
Int. Cl.[4] G02B *21/20, 21/36*
U.S. Cl. 350—502 **17 Claims**

1. A microscope body having an optical system comprising:
telescope objective means for imaging light from an infinity corrected objective having a predetermined amount of residual lateral color;
a beam divider receiving light from said telescope objective means;
means for providing a pair of eyepiece focal planes including light transmitting elements; and
deflectors to direct light from said telescope objective means to said eyepiece focal planes, said telescope objective means, beam divider and light transmitting elements hav-

ing individual glass properties selected to compensate, in combination, for said predetermined amount of residual



lateral color of the objective without the introduction of axial color aberration.

4,715,698

HEATER-EQUIPPED OUTER REARVIEW MIRROR

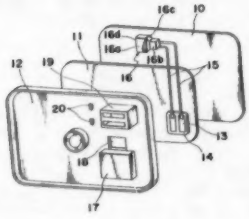
Shinji Haba, Aichi, Japan, assignor to Kabushiki Kaisha Tokai Rika Denki Seisakusho, Aichi, Japan

Filed Dec. 9, 1986, Ser. No. 939,718

Claims priority, application Japan, Dec. 9, 1985, 60-190046[U]

Int. Cl.[4] B60R *1/06*

U.S. Cl. 350—588 3 Claims



1. A heater-equipped outer rearview mirror comprising:

a mirror;

a mirror holder for holding said mirror;

a flat heater interposed between said mirror and said mirror holder;

a connector; and

lead wires connecting said heater to said connector, sait flat heater having a terminal fixing portion which protrudes from a back face thereof and is connected to terminals of said lead wires,

said mirror holder including a box, which is provided at the back face thereof so as to accomodate said terminal fixing portion, a hole, which penetrates therethrough to permit said lead wires and said connector to pass therethrough from the front face of said mirror holder toward the back face thereof, and a connector holding portion which protrudes from the back face of said mirror holder so as to hold said connector therein.

4,715,699

SCANNING OPTICAL SYSTEM FOR LASER BEAM PRINTERS

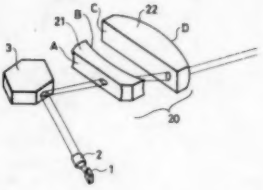
Akira Morimoto, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 28, 1986, Ser. No. 823,236

Claims priority, application Japan, Jan. 28, 1985, 60-13989; Apr. 22, 1985, 60-86705

Int. Cl.[4] G02B *26/08*

U.S. Cl. 350—6.8 9 Claims



1. In a scanning optical system composed of a semiconductor laser, a collimator lens that produces substantially parallel rays of light from the beam emitted from the semiconductor laser, a deflector for deflecting said parallel rays of light, and a scanning lens system that focuses the deflected rays to form a spot on a scanning surface, the improvement wherein the normal direction in which light emitting from the semiconductor laser has a wide angle spread is in alignment with a scanning direction of said scanning optical system, said scanning lens system having an anamorphic configuration and being so designed that the point of an image formed in an auxiliary scanning direction upon receiving parallel rays of light containing no astigmatism is offset from the point of an image formed in the scanning direction.

4,715,700

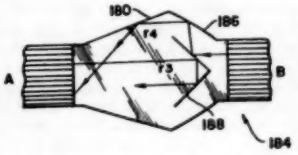
LIGHT EMITTING OPTICAL FIBER ASSEMBLIES INCLUDING LIGHT CONTROLLING

Maurice Daniel, 550 Jaycox Rd., Avon Lake, Ohio 44012

Division of Ser. No. 427,155, Sep. 29, 1982, Pat. No. 4,519,017. This application May 7, 1985, Ser. No. 731,511

Int. Cl.[4] G02B *6/36, 7/00, 17/00, 6/26*

U.S. Cl. 350—618 7 Claims



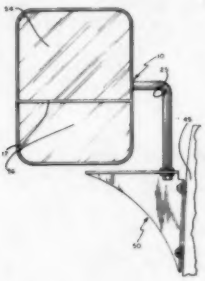
1. A light controlling diode assembly including a transmitting optical unit having a light input end and a light output end and optical diode means mounted in said optical unit between the input and output ends thereof, said optical diode means including a first surface means positioned to face said light output end and operative to reflect light passing from said output end toward said input end back to said output end and second surface means positioned to deflect light from said input end toward said output end.

4,715,701

MIRROR AND BRACKET ASSEMBLY

Milfred W. Urban, 1337 N. Meridian, Wichita, Kans. 67203

Filed Jul. 23, 1986, Ser. No. 888,413
Int. Cl.[4] G02B 5/10, 7/18
U.S. Cl. 350—625 13 Claims



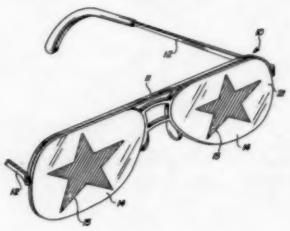
1. A break-away rearview mirror comprising a mirror housing having a lower housing recess and an upper housing recess separated from said lower housing recess by a partition; at least one lower central support means secured generally to the approximate center of the bottom of said lower housing recess and a plurality of lower peripheral support means attached to the bottom of said lower housing recess and generally circumscribing said lower central support means; at least one upper central support means attached generally to the approximate center of the bottom of said upper housing recess and a plurality of upper peripheral support means secured to the bottom of said upper housing recess and generally circumscribing said upper central support means; a first bonding means with a predetermined setting time positioned on top of said upper and lower central support means; a second bonding means with a predetermined setting time that is longer than said predetermined setting time of said first bonding means and positioned on top of said plurality of upper and lower peripheral support means whereby when said second bonding means sets, it sets into an elastic, rubbery solid; a flat mirror of unity magnification disposed on said upper central support means and said plurality of upper peripheral support means, and bonded thereto by said first and second bonding means after the same have solidified; a convex mirror optically pre-aligned disposed on said lower central support means and said plurality of lower peripheral support means and bonded thereto by said first and second bonding means after the same have solidified; said second bonding means adapted upon solidification to provide a cushion effect for the flat mirror and the convex mirror against the upper and lower peripheral support means, respectively, to prevent the mirrors from breaking or becoming misaligned in the event the mirror housing is dropped or jarred; a mirror bracket means attached to said mirror housing; a molded synthetic resin bracket means comprising a generally hollow structure having a bracket recess for receiving therethrough said bracket means and a pair of generally rectangular mating box-like members, each including a pair of end walls and a pair of side walls, an end wall of each pair of boxlike members including a semi-cylindrical recess defining a portion of said bracket recess such that when said box-like members mate, the semi-cylindrical recess on each portion of said box-like members are aligned when the bracket recess is formed; a means for attaching said mirror bracket means to said molded bracket means to hold said mirror housing in an upright positon; and a mounting bracket means connecting to said molded bracket means to mount said combined mirror housing-mirror bracket means-molded bracket means on an automobile and, said mounting bracket means having a structural portion of same being encased within said synthetic resin bracket means, said combined mirror housing-mirror bracket means breaking-away from said molded synthetic resin bracket means upon impact.

4,715,702

DECORATIVE LENS

Stephen M. Dillon, 7442 E. Butherus Dr., Scottsdale, Ariz. 85260

Filed Oct. 20, 1986, Ser. No. 920,762
Int. Cl.[4] G02C 7/10; G02B 5/30
U.S. Cl. 351—44 9 Claims



1. A multiple element construction comprising:

a first transparent element having a first pattern formed thereon,

said first pattern having a first color and a field surrounding said first pattern having a second color,

a second transparent element coated with a relatively thin layer of reflective material,

said thin layer of reflective material being so thin and sparsely applied so that only a fraction of light impinging thereon is reflected and the remainder passes therethrough, and

a third transparent element having a second pattern identical to said first pattern formed thereon in axial alignment with said first pattern,

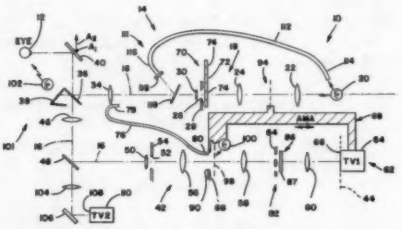
said second pattern having a color identical with said second color of said first element and the field surrounding said second pattern having a color identical with said first color of said first pattern.

4,715,703

OCULAR-FUNDUS ANALYZER

Tom N. Cornsweet, and Samuel Hersh, both of Mission Viejo, Calif., assignors to Rodenstock Instrument Corporation, Los Angeles, Calif.

Continuation of Ser. No. 433,813, Oct. 12, 1982, abandoned.
This application Jan. 14, 1986, Ser. No. 818,913
Int. Cl.[4] A61B 3/10, 3/14
U.S. Cl. 351—205 24 Claims



1. Apparatus for examining the ocular fundus of an eye comprising:

(a) illuminating means for illuminating the ocular fundus, said illuminating means including aperture means having

the form of non-overlapping apertures positioned substantially side by side and image forming means for forming an image of said aperture means on a part of the ocular fundus;

(b) imaging means, responsive to reflections from said illuminated ocular fundus, for forming an image of the ocular fundus at a detecting plane, said imaging means including stereo means for providing a stereo pair of images of the ocular fundus at said detecting plane;

(c) detecting means for detecting an image of the ocular fundus appearing at said detecting plane; and

(d) electronic data processing means connected to said connecting means for electronically processing and digitally analyzing said image thereby to display information about the ocular fundus under examination.

4,715,704

LIGHT TRAP FOR SURGICAL OPERATION MICROSCOPES

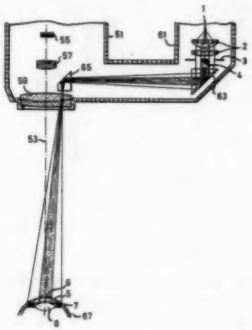
Klaus Biber, Aalen, and Gerhard Unold, Essingen, both of Fed. Rep. of Germany, assignors to Carl-Zeiss-Stiftung, Heidenheim, Fed. Rep. of Germany

Continuation of Ser. No. 660,896, Oct. 15, 1984, abandoned. This application Oct. 21, 1986, Ser. No. 921,596

Claims priority, application Fed. Rep. of Germany, Oct. 28, 1983, 3339172

Int. Cl.[4] A61B *3/10, 3/08*

U.S. Cl. 351—207 **1 Claim**



1. The method of illuminating an eye of a patient during surgery thereon, which comprises:

(a) providing a surgical operation microscope having a microscope optical system which may be focused on an eye to be operated upon;

(b) providing said microscope with an illumination system for projecting an illuminating beam of light onto said eye to be operated upon;

(c) providing a shiftable blocking member shiftable between a blocking position and a non-blocking position with respect to said beam of light;

(d) said blocking member when in its effective blocking position serving to intercept and block a central core portion of said beam of light to prevent the central core from reaching the eye to be operated upon while allowing a ring of light around said blocked central core to reach said eye, said blocked central core at the location where said beam impinges on the eye being substantially concentric with and of approximately the same size as the pupil of the eye, so that direct light of said beam will not enter the eye through the pupil and reach the retina and fundus portions of the eye;

(e) said method further comprising keeping said blocking member in its said effective position during at least a substantial part of an operation on the eye, to relieve the patient of discomfort which would be caused by impingement of said illuminating beam onto the retina of the eye; and

(f) moving said blocking member to its ineffective position only for brief intervals during the operation, only when additional illumination of the retina and fundus portions of the eye is temporarily needed.

4,715,705

METHOD FOR PRESENTATION OF INFORMATION OF A PLURALITY OF SHEETSHAPED INFORMATION CARRIERS AND A DEVICE FOR THE ACCOMPLISHMENT OF THE METHOD

Bert Nord, Västra Frölunda, Sweden, assignor to Ingenjorsfirma B Nord AB, Sweden

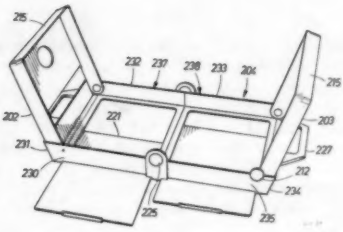
PCT No. PCT/SE85/00284, § 371 Date Mar. 20, 1986, § 102(e) Date Mar. 20, 1986, PCT Pub. No. WO86/01008, PCT Pub. Date Feb. 13, 1986

PCT Filed Jul. 18, 1985, Ser. No. 849,452

Claims priority, application Sweden, Jul. 23, 1984, 8403821

Int. Cl.[4] G03B *21/54*

U.S. Cl. 353—120 **8 Claims**



1. A device for presentation of information including a plurality of sheetshaped information carriers which are connected to each other in continuous series of said sheets, which sheets along opposite edge portions are connected with each other along folding lines so that the series of sheets extends zig-zag like and in a stored position form a pack of said sheets, in which pack the sheets are close to each other and from which the sheets can be folded out for presentation of information on the sheets, said device further including two side support means arranged on the sides of a presentation means, said presentation means being pivotable along a central line around a pivot, said side support means being positioned with an interspace relative to each other, said interspace being approximately twice the width of each sheet between said folding lines so that two of said sheets can be held extended on said presentation means, one of said side supports being arranged to support said pack of sheets, whereas the other side support means is arranged to receive sheets which consecutively are folded over to said second side support means.

4,715,706

LASER DOPPLER DISPLACEMENT MEASURING SYSTEM AND APPARATUS

Charles P. Wang, 1180 Mahalo Pl., Compton, Calif. 90220

Filed Oct. 20, 1986, Ser. No. 920,660

Int. Cl.[4] G01C *3/08*

U.S. Cl. 356—5 **4 Claims**

1. Apparatus for measuring the displacement of a moving retro-reflective target from a reference position comprising: a laser for producing a laser beam of a particular frequency ω_o; oscillator means for producing an electrical heterodyning reference signal of a particular frequency Ω; an optical modulator interposed between the laser and the target for passing the laser beam ω_o from the laser to the target to be reflected thereby as a reflected laser beam $\omega_o+\omega_D$ parallel to and displaced from the laser beam ω_o and having a frequency shift ω_D

proportional to the velocity of the target and connected to said oscillator means for producing a refracted laser beam $\omega_o \pm \Omega$ having a frequency shifted by a predetermined amount Ω; beam combining means positioned in the paths of the refracted beam $\omega_0 \pm \Omega$ from the modulator and the reflected beam $\omega_o + \omega_D$ from the target for combining the two beams and for producing a combined output beam $\Omega \pm \omega_D$ in response thereto; a photodetector positioned in the path of the combined

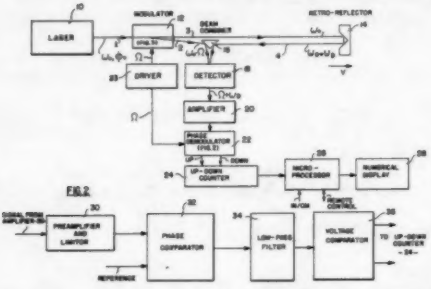


FIG. 2

output beam $\Omega + \omega_D$ from the beam combining means for producing an electrical beat output signal $\Omega + \omega_D$ in response thereto; means including a phase-demodulator coupled to said detector and to said oscillator means and responsive to the beat output signal $\Omega + \omega_D$ from said detector for comparing the phases of said beat output signal $\Omega + \omega_D$ and said reference signal Ω to produce an output signal $\Delta\phi$ having a phase displacement from said reference signal Ω proportional to the displacement ΔZ of the target from the reference position,

$$\Delta Z = \frac{C}{2\omega_o}\left(N + \frac{\phi}{2\pi}\right),$$

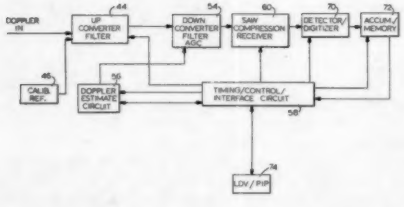
where C is the speed of light, N is the number of half wavelengths, and ϕ is the phase angle less than 2π; and for applying the heterodyning signal to the optical modulator and to the phase demodulator; and utilization means coupled to said phase demodulator and responsive to the output signal therefrom for providing a measurement of the displacement of the target from the reference position.

4,715,707

LASER DOPPLER VELOCIMETER WITH LASER BACKSCATTER DISCRIMINATOR

Albert H. Reynolds, III, St. Louis County; Ernie C. McDaniel, St. Charles County, and Roland E. Juhala, St. Charles, all of Mo., assignors to McDonnell Douglas Corporation, St. Louis, Mo.

Filed Apr. 3, 1986, Ser. No. 847,723
Int. Cl.[4] G01P *3/36*; G01S *7/48*
U.S. Cl. 356—28.5 **9 Claims**



1. A laser doppler velocimeter with laser backscatter discrimination for determining the relative velocity between an optical platform and another target, comprising:

means for generating a laser beam and directing said beam toward said target;

detector means for producig a doppler signal in response to the detection of said laser beam;

means for rejecting selected noise and backscatter signals from the doppler signal with band widths and amplitudes outside selected thresholds; and

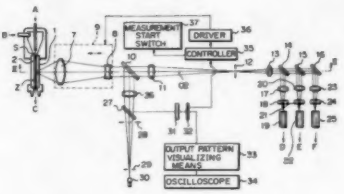
means for enhancing the legitimate doppler signal from the target further comprising means for taking a selected number of spectra of the detected doppler signal, means for averaging said spectra to produce data from which a velocity sample is determined, means for determining the minimum and maximum derivatives of the average spectrum, and means for rejecting the velocity sample if the width difference between the frequencies of minimum and maximum derivatives exceeds a predetermined threshold.

4,715,708

PARTICLE ANALYZING APPARATUS WITH INDEX PROJECTING OPTICAL SYSTEM FOR DETECTING A FOCUSING STATE OF THE MEASURING SYSTEM

Yuji Ito, Chigasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed May 28, 1986, Ser. No. 867,496
Claims priority, application Japan, Jun. 5, 1985, 60-121885
Int. Cl.[4] G01N *21/01*; G03B *3/10*
U.S. Cl. 356—72 **11 Claims**



1. A particle analyzing apparatus comprising:

an irradiating optical system for emitting a particle analyzing beam onto a particle to be examined, the particle flowing in a flow section of a flow cell;

a measuring optical system for measuring light obtained by scattering of the particle analyzing beam by the particle to be examined, and/or fluorescent light obtained therefrom;

an index projecting optical system for projecting at least two non-parallel index beams for detecting a focusing state of said measuring optical system with respect to said flow section of said flow cell; and

a focusing state detection system for detecting the focusing state in accordance with an output pattern obtained by receiving the focusing detection beams reflected by first and second walls of said flow cell.

4,715,709

SURFACE FLAW DETECTING METHOD AND APPARATUS

Yoshitada Sekine, Yoya; Fumiki Yokota, Yamato, and Hisashi Kubota, Fujisawa, all of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

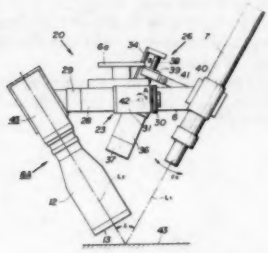
Filed Apr. 26, 1985, Ser. No. 727,874
Claims priority, application Japan, Apr. 27, 1984, 59-83888; Apr. 27, 1984, 59-83889; Apr. 27, 1984, 59-83890
Int. Cl.[4] G01N *21/88*
U.S. Cl. 356—237 **11 Claims**

1. A method for detecting flaws in the surface of an object to be inspected, comprising the steps of:

transmitting a laser beam in a slit configuration onto a surface of the object;

projecting the laser beam reflected by the surface of the object onto a part of a light-scattering plane sceen;

forming an image of the surface of the object on the part of the screen, the image having a first configuration in the form of a continuous slit when the surface of the object



has no flaw and having a second configuration in the form of a slit with a corresponding discontinuity when the surface of the object has a flaw;

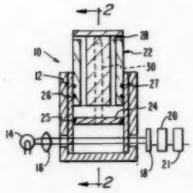
detecting both the first and second configurations of the image of the surface on said part of said screen; and

producing a train of pulses in response to said first and second configurations of the image in which a possible surface flaw is indicated by a particular output level.

4,715,710
PUMP COLORIMETRIC ANALYZER

Marinus L. Andersen, Loveland, Colo., assignor to Hach Company, Loveland, Colo.

Filed Feb. 19, 1986, Ser. No. 830,969
Int. Cl.⁴ G01N *1/10, 21/85*
U.S. Cl. 356—246 **20 Claims**



1. A pump colorimetric analyzer comprising:

(a) a sample cell adapted to permit a light beam to be transmitted therethrough;

(b) a light source adapted to transmit a light beam through said sample cell;

(c) a photodetector adapted to detect light transmittance through said sample cell from said light source;

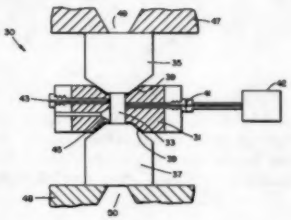
(d) a piston adapted to reciprocate between first and second positions within said sample cell, said piston having a sample chamber therein which is adapted to permit said light beam from said light source to be transmitted through said chamber in said piston to said photodetector when said piston is in said second position, said piston further including means for introducing a liquid sample into said chamber and expelling said liquid sample from said chamber;

wherein said analyzer is adapted to measure light transmittance through a first liquid sample present in said sample cell when said piston is in said first position and is adapted to measure light transmittance through a second liquid sample present in said sample chamber when said piston is in said second position.

4,715,711
MINIATURE SAPPHIRE ANVIL CELL FOR RESERVOIR FLUID PROPERTY STUDIES

Keh-Jim Dunn, Fullerton, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Continuation-in-part of Ser. No. 789,058, Oct. 18, 1985, abandoned. This application Feb. 4, 1987, Ser. No. 10,601
Int. Cl.⁴ G01N *1/10*
U.S. Cl. 356—246 **3 Claims**



1. A high-pressure cell for measuring the properties of a petroleum reservoir fluid sample, comprising:

two truncated, essentially conical, transparent sapphire anvils having opposing flat surfaces, said anvils being aligned on the same lengthwise axis;

a pressure vessel for containing a sample under high pressure having an inner chamber with an opening at each end of said pressure vessel, said pressure vessel being located between said sapphire anvils such that the opposing surfaces of said sapphire anvils are placed over said openings to form a high-pressure fluid-tight seal;

gaskets located between said anvils and said pressure cell to ensure a pressure and fluid tight seal, wherein said gaskets are made a material selected from the group consisting of soft metals and strong polymeric materials, said seals being formed by the yield point of said gaskets being exceeded by the compressive forces that the sapphire anvils exert on said pressure cell;

a high-pressure inlet connected to said pressure vessel to admit a sample under high pressure;

a high-pressure pump operably connected to said high-pressure inlet;

a high-pressure outlet connected to said pressure vessel to remove said pressurized sample; and

a pushing block located at the base of at least one sapphire anvil, said block having an aperture in the area adjacent to the sapphire anvil such that light may pass through the aperture in the block, the sapphire anvil, and the pressure vessel.

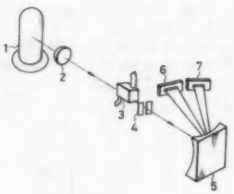
4,715,712
MULTIWAVELENGTH SPECTROPHOTOMETER

Taro Nogami, Katsuta, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 11, 1985, Ser. No. 710,389
Claims priority, application Japan, Mar. 14, 1984, 59-47048
Int. Cl.⁴ G01J *3/42, 3/36*
U.S. Cl. 356—328 **8 Claims**

8. A multiwavelength spectrophotometer, particularly for liquid chromatography comprising a light source, a sample cell, a grating for dispersing a light beam from said light source, a first multichannel light detector means for detecting light dispersed by said grating in a first wavelength range, a second multichannel light detector means for detecting light dispersed by said grating in a second wavelength range overlapping at least partly said first wavelength range, said light

detected by said second multichannel light detector means having a different order of interference in comparison to the order of interference of said light detected by said first multichannel light detector means, and a processor means for averaging output signals of each of said first and second light detec-



tor means so as to provide output signals with an improved S/N ratio at least in the second wavelength range, the first and second light detector means being identical first and second photodiode arrays and the averaging of the output signals of the first and second photodiode arrays following the formula

$$\frac{k_1 A + k_2 \frac{(B(1) + B(2)}{2}}{k_1 + k_2}$$

whereby,

A is the output signal of a photodiode of the first array covering a predetermined wavelength range, B(1) and B(2) are the output signals of two neighboring photodiodes of the second array covering together the same predetermined range and k_1, k_2 are weight factors for the output signals A and

$$\frac{B(1) + B(2))}{2}.$$

4,715,713

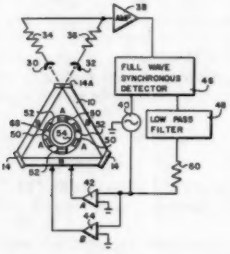
PATH LENGTH ADJUSTER FOR RING LASER GYRO

Thomas J. Hutchings, Canoga Park, Calif., assignor to Litton Systems Inc., Beverly Hills, Calif.

Filed Jun. 28, 1985, Ser. No. 750,425

Int. Cl.[4] G01C *19/64*

U.S. Cl. 356—350 **26 Claims**



1. A ring laser comprising;

a substantially rigid laser body block, including openings formed therein containing lasing material defining at least three substantially straight intersecting path branches, said intersections defining corners of a ring laser path;

at least three corner-mirrors, equal in number to said intersections, each rigidly supported by said body block at separate said corners, said mirrors being positioned and angled to reflect laser radiation in said ring laser path;

means for delivering energy to said lasing material;

a first plurality of forcer means, one for each of said corners, each positioned to apply a force between the other said forcer means of that said first plurality of forcer means, and said rigid laser body block along lines of action intersecting said mirrors and bisecting the angles between the respective adjacent laser path branches;

a second plurality of forcer means, one for each of said branches, each positioned to apply a force between the other said forcer means, of said second plurality of forcer means, and said rigid laser body block along lines of action intercepting said branches;

the forces of said first and second plurality of forcer means being adjusted to compensate for changes in length of said total laser path.

4,715,714

MEASURING DEVICE FOR DETERMINING RELATIVE POSITION BETWEEN TWO ITEMS

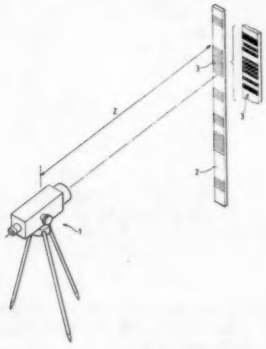
Bernhard Gaechter, Balgach; Bernhard Braunecker, Widnau, and Fritz Muller, Balgach, all of Switzerland, assignors to Wild Heerbrugg AG, Heerbrugg, Switzerland

Filed Dec. 27, 1984, Ser. No. 686,889

Claims priority, application Switzerland, Dec. 30, 1983, 6994/83

Int. Cl.[4] G01B *11/14*

U.S. Cl. 356—375 **28 Claims**

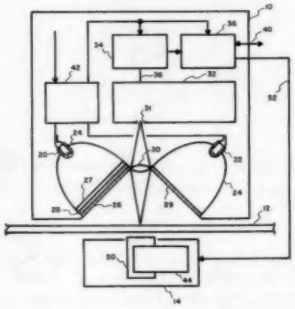


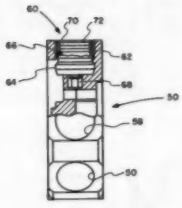
1. A measuring device for determining the relative position between a first item and a second item, said first and second items being movable with respect to each other, said first item comprising a code carrier, a single passive dimensional code pattern arranged on said code carrier; said second item including optical means to remotely read said passive code pattern, code reader means to sample the image of said code pattern and to produce a digital signal corresponding thereto, computer means to receive said signal, said computer means comprising means to store information corresponding to said passive code pattern, said code pattern being able to retain the quasi-stochastic characteristics required for decoding, and said computer means comprising means to integrate and compare at least a part of said sampled signal to a corresponding part of said store information to thereby determine said relative position.

4,715,715
SYSTEM FOR MEASURING THE COLOR OF A MATERIAL

John Howarth, Monte Sereno, and Mark Alguard, Palo Alto, both of Calif., assignors to Measurex Corporation, Cupertino, Calif.

Continuation of Ser. No. 668,761, Nov. 6, 1984, abandoned. This application Mar. 20, 1987, Ser. No. 29,350
Int. Cl.[4] G01N *21/86*; G01J *3/46*
U.S. Cl. 356—402 7 Claims





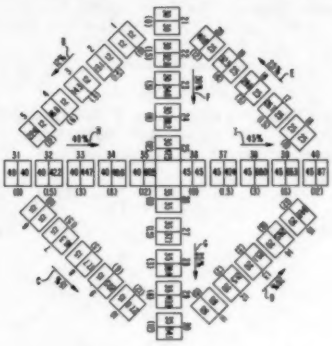
1. A system for measuring the color of a moving sheet of material which is being produced, the system comprising:
(a) means for causing the sheet to move;
(b) means for illumination the sheet;
(c) sensor means located to a first side of the sheet for receiving light from the sample material;
(d) means for measuring the intensities of predetermined frequencies of light received by the sensor; and,
(e) backing means for reflecting light from the sheet back toward the sheet, said backing means being constructed so that the sheet moves relative to said backing means and said backing means including backing material which is substantially the same as the sheet, said backing material being spaced apart from the sheet.

4,715,716
RHOMBIC-SHAPED SCALE DEVICE FOR USE IN JUDGING DISCOLORATION, FADING OR STAINING

Nagaichi Suga, 2-8, 1-chome, Toyama, Shinjuku-ku, Tokyo, and Kiyoshi Chaki, c/o Suga Test Instruments Co., Ltd., 4-14, Shinjuku 5-chome, Shinjuku-ku, Tokyo, both of Japan

Filed Mar. 28, 1986, Ser. No. 845,686
Claims priority, application Japan, Mar. 29, 1985, 60-66235
Int. Cl.[4] G01J *3/52*
U.S. Cl. 356—421 5 Claims

1. A scale device for use in judging the amount of disoloration or fading, or for judging the amount of staining, of a sample after a test of the sample for light fastness of dyeing or resistance to staining, said scale device comprising:
a plurality of scales of the same color, each scale having a plurality of patches with first and second portions, the first portion of each patch having the same luminous reflectance and the second portion of the respective patches having successively varied luminous reflectances so as to give to the patches progresive values of color differences, the luminous reflectance of the first portion of the patches

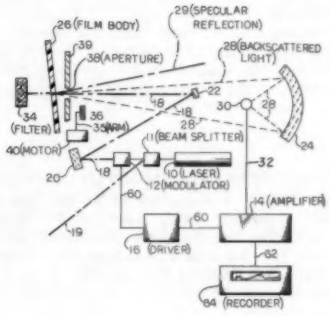


of each scale being different from the luminous reflectances of the first portion of the patches of the other scales, four of said scales being arranged in a rhombic arranged and the remainder of said scales being in a cross shaped within said rhombic arrangement.

4,715,717
METHOD FOR MONITORING SURFACE TEXTURE AND QUALITY FOR MOVING TRANSPARENT FILM BODIES

John C. Evans, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Dec. 5, 1985, Ser. No. 804,958
Int. Cl.[4] G01N *21/84*
U.S. Cl. 356—429 11 Claims



1. A method for online detection of surface texture of a moving transparent film body, comprising the steps of:
extruding from a die, a material suitable for forming the moving transparent film body;
injecting a fluid into the extruded material to form a bubble of the moving transparent film body;
slightly deflating the bubble with conventional deflating means;
prior to complete deflation of the bubble, irradiating the moving transparent film body with a beam of collimated electromagnetic radiation at an angle of incidence sufficient to produce detectable backscattered electromagnetic radiation and specularly reflected electromagnetic radiation from said moving transparent film body;

avoiding the specularly reflected electromagnetic radiation and collecting the backscattered electromagnetic radiation;

directing the collected backscattered; electromagnetic radiation to a detector to produce a signal proportional to the intensity of the collected backscattered electromagnetic radiation directed to the detector; and

evaluating the signal so that the surface texture can be detected.

4,715,718

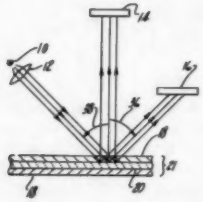
METHOD AND APPARATUS FOR ON-LINE MONITORING OF LAMINATE BOND STRENGTH

John C. Evans, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Jun. 24, 1985, Ser. No. 748,363

Int. Cl.[4] G01N *21/47*

U.S. Cl. 356—446 **15 Claims**



1. A method for the on-line determination of the bonding strength of a plural layer laminate having at least one inner and one outer layer, said outer layer being transparent to electromagnetic radiation, said method comprising:

(a) directing a collimated beam of electromagnetic radiation transmitted onto a surface of said inner layer through said transparent outer layer at an incident angle substantially greater than a normal to the surface of said laminate;

(b) measuring the scattered and diffusely reflected intensity value of said electromagnetic radiation reflected from said inner layer at two substantially different diffuse reflectance angles;

(c) converting said reflected intensity value to a diffuse intensity ratio derived value which is proportional to the adhesion of the laminate based upon a predetermined relationship of the bonding strength of said laminate and said derived value.

4,715,719

METHOD OF PREPARING MORTAR OR CONCRETE

Yasuro Ito; Yoshiro Higuchi, both of Tokyo; Takeshi Shiki, Funabashi; Yukikazu Tsuji, Ashikaga; Masanori Tsuji, Osaka, and Mitsutaka Hayakawa, Kamakura, all of Japan, assignors to Yasuro Ito and Taisei Corporation, Tokyo, Japan

PCT No. PCT/JP84/00008, § 371 Date Sep. 13, 1984, § 102(e) Date Sep. 13, 1984, PCT Pub. No. WO84/02872, PCT Pub. Date Aug. 2, 1984

Continuation of Ser. No. 654,003, Sep. 13, 1984, abandoned. This PCT application Jan. 18, 1984, Ser. No. 882,034

Claims priority, application Japan, Jan. 18, 1983, 58-5216; Apr. 5, 1983, 58-58639

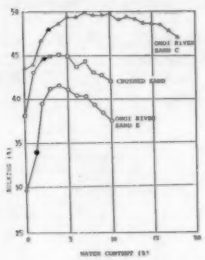
Int. Cl.[4] B28C *5/00*

U.S. Cl. 366—2 **5 Claims**

1. A method of preparing mortar or concrete, which comprises the steps of:

determining respectively a percentage of water contained in or adhered to a fine aggregate equivalent to a JIS surface-dry water percentage, minimum and maximum adhesion water percentages of the fine aggregate, and a percentage of water of the fine aggregate in which interstice thereof is saturated with water while a surface thereof is dry;

determining a quantity of water necessary to be added for preparation of the mortar or concrete in accordance with a multiple of a given value with respect to said minimum adhesion water percentage; and



mixing a powder of hydraulic compound with a fine aggregate and the calculated amount of water.

4,715,720

DRUM MIX ASPHALT PLANT WITH KNOCK-OUT BOX AND SEPARATE PUGMILL COATER

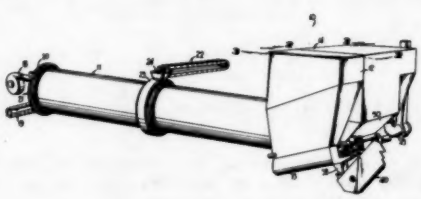
J. Donald Brock, Chattanooga, Tenn., assignor to Astec Industries, Inc., Chattanooga, Tenn.

Continuation of Ser. No. 668,290, Nov. 5, 1984, Pat. No. 4,616,934. This application Aug. 18, 1986, Ser. No. 882,294

The portion of the term of this patent subsequent to Oct. 14, 2003, has been dicclaimed.

Int. Cl.[4] B28C *5/46*

U.S. Cl. 366—25 **3 Claims**



1. An apparatus for manufacturing asphalt paving composition, comprising:

a rotary drum having upper and lower ends;

means for introducing aggregate into the upper end of said rotary drum;

means for heating the interior of said rotary drum, whereby said aggregate introduced into the upper end of said rotary drum is dried and heated as it travels through said rotary drum;

mixing means;

means for introducing said heated aggregate from the lower end of said rotary drum into said mixing means;

exhaust means for creating an exhaust airflow through and out of said rotary drum, whereby airborne particulate matter generated by the drying and heating of said aggregate is extracted from the interior of said rotary drum in said exhaust airflow;

collection means for causing a portion of said particulate matter suspended in said exhaust airflow to drop out of said exhaust airflow into said mixing means, whereby said portion of said particulate matter is recovered from said exhaust airflow; and

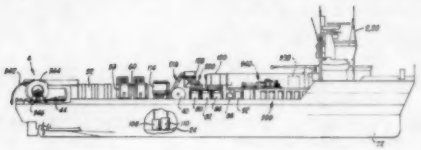
means for introducing liquid asphalt into said mixing means, whereby said aggregate is dried and heated in said rotary drum and mixed with said recovered particulate matter and said liquid asphalt in said mixing means to form an asphalt paving composition.

4,715,721

TRANSPORTABLE INTEGRATED BLENDING SYSTEM

Lonnie R. Walker; Leslie N. Berryman; Larry E. Guffee, all of Duncan; David E. Ripley, Marlow, and David A. Prucha, Duncan, all of Okla., assignors to Halliburton Company, Duncan, Okla.

Filed Jul. 19, 1985, Ser. No. 757,112
Int. Cl.[4] B01F *15/00*
U.S. Cl. 366—132 16 Claims



1. A transportable integrated system of components commonly and simultaneously transportable from one location to another, at each of which locations a respective blend of produced from a plurality of substances contained within and transported by the system, said system comprising:

a blend producing facility;

floatable means for transporting said blend producing facility on water to a respective one of the locations; and

wherein said blend producing facility includes:

blender means, mounted on said floatable means, for blending a plurality of substances into a respective blend needed at the respective one of the locations;

storage means, mounted on said floatable means, for storing a particulate material defining one of the plurality of substances;

surge bin means, mounted on said floatable means, for receiving at least a portion of the particulate material;

means, mounted on said floatable means, for conveying particulate material from said storage bin means to said surge bin means; and

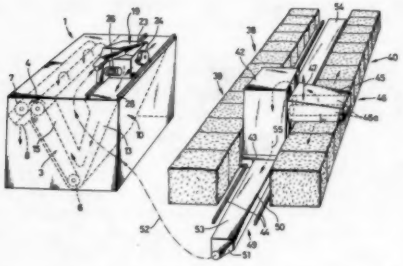
means, mounted on said floatablemeans, for transferring a controllable quantity of the particulate material from said surge bin means to said blender means.

4,715,722

PROCESS AND APPARATUS FOR FEEDING FIBER MATERIAL

Adolph Hergeth, Düilmen; Günter Lucassen, Haltern, both of Fed. Rep. of Germany, and Akiva Pinto, Gastonia, N.C., assignors to Hergeth Hollingsworth, GmbH, Duelmen, Fed. Rep. of Germany

Filed Feb. 24, 1986, Ser. No. 832,905
Claims priority, application Fed. Rep. of Germany, Feb. 23, 1985, 3506476; Feb. 8, 1986, 3603997
Int. Cl.[4] B01F *15/02*
U.S. Cl. 366—132 24 Claims



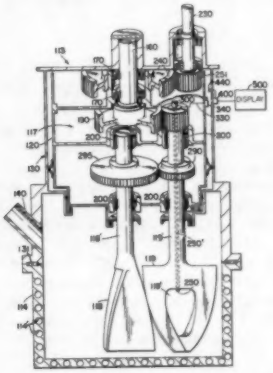
1. In a textile process for feeding fiber material, such as cotton and the like, from an opening device which opens pressed bales of fiber material set up in a row to a hopper feeder, said process being of the type which comprises delivery of the opened fiber material successively removed layerwise from the bales by pneumatic means to the hopper feeder into a receiving chamber ahead of an inclined upwardly extending spiked feed lattice for the transmittal to a processing machine, wherein the improvement comprises delivering the fiber material removed continuously from the row of bales to the receiving chamber of the hopper feeder transversely to the hopper feeder and parallel to the spiked feed lattice in a manner that said fibers are deposited layerwise across and parallel to the spiked feed lattice.

4,715,723

ARRANGEMENT FOR CONTROLLABLY MIXING VOLATILE MATERIALS

Roy W. Anderson, San Jose; Stephen J. Ross, Morgan Hill, and Larry D. Henderson, San Jose, all of Calif., assignors to United Technologies Corporation, Hartford, Conn.

Filed Nov. 28, 1986, Ser. No. 936,049
Int. Cl.[4] B01F *15/00*
U.S. Cl. 366—142 5 Claims



1. A mixing arrangement for mixing volatile materials comprising containment means for holding the materials to be mixed, said containment means defining holes for circulation of cooling fluid, first blade means for mixing said materials and drive means for turning said blade means to conduct mixing operation with respect to said materials, said mixing apparatus characterized in that said first blade means includes temperature detection means for monitoring bulk temperature levels within the materials being mixed and an external display arrangement for temperature levels detected by said temperature detection means and radio communication with said drive means.

4,715,724

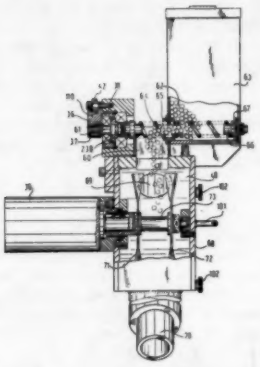
HEAD ATTACHMENT FOR A HYDRAULIC SYNTHETIC-RESIN WORKING MACHINE FOR COLORED SYNTHETIC RESIN

Gerrit J. Ter Beek, No. 61a Binnenhavenstraat, 7553 GH Hengelo, and Albertus Ter Beek, No. 5, Palfijnstraat, 7555 MP Hengelo, both of Netherlands

Filed Sep. 21, 1981, Ser. No. 303,928
Claims priority, application Netherlands, Sep. 22, 1980, 8005275
Int. Cl.[4] B01F *15/02*
U.S. Cl. 366—157 20 Claims

1. A head attachment for a hydraulic, synthetic resin processing machine for colored synthetic resin, said attachment comprising a mixer, a synthetic resin supply vessel directly connected to said mixer, a coloring mass supply vessel con-

nected to said mixer through a dosing device, and a reciprocating hydraulic motor and coupling for intermittently driving



the dosing device upon stroking of the motor in one direction only.

4,715,725

STEP MOTOR CONTROL MECHANISM FOR ELECTRONIC TIMEPIECE

Yoshikazu Kawamura; Minoru Hosokawa; Sakiho Okazaki, and Hiroshi Ishii, all of Suwa, Japan, assignors to Seiko Epson Corporation, Japan

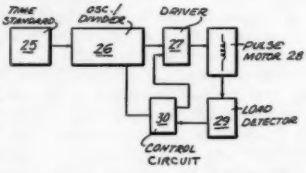
Continuation of Ser. No. 742,832, Jun. 10, 1985, Pat. No. 4,599,005, which is a continuation of Ser. No. 430,292, Mar. 10, 1985, Pat. No. 4,522,507, which is a continuation of Ser. No. 133,046, Mar. 24, 1980, Pat. No. 4,370,065, which is a continuation of Ser. No. 839,867, Oct. 6, 1977, Pat. No. 4,212,156. This application Jun. 25, 1986, Ser. No. 860,404

Claims priority, application Japan, Oct. 6, 1976, 51-120146

The portion of the term of this patent subsequent to Jan. 25, 2000, has been disclaimed.

Int. Cl.[4] G04F *5/00*

U.S. Cl. 368—157 **2 Claims**



1. An electronic timepiece having a step motor and comprising a quartz crystal vibrator producing a high frequency time standard signal, divider circuit means for producing low-frequency time signals in response to said high frequency time standard signals; a gear train driven by said step motor and adapted to place the step motor in one of a first normally loaded condition and a second loaded condition; load detection means for producing a load detection signal in response to detecting said second loaded condition of said step motor; driving and control means intermediate said divider circuit means and said step motor for receiving the low frequency signal from the dividing circuit means, said driving and control means being adapted to apply a first drive signal having a first pulse shape to said step motor during a predetermined unit of time defining the period of the first pulse to said step motor in response to said low frequency signal, said driving and control means, in response to said load detection signal being applied thereto, being adapted to apply a second drive signal having a second pulse shape of larger energy than said first pulse shape to said step motor, said step motor including drive coil means for receiving said first drive signal produced by said driving and control means, said load detecting means being adapted to detect induced current in said coil means after said first drive signal is applied thereto, said driving and control means, in response to said load detection signal being applied thereto, being adapted to apply the second drive signal having a second pulse shape of the same polarity as said first pulse shape to said drive coil means, said second pulse being applied during said predetermined unit of time.

4,715,726

METHOD OF MEASURING THE STRENGTH OF CONCRETE FOR SLIP FORM PROCESS

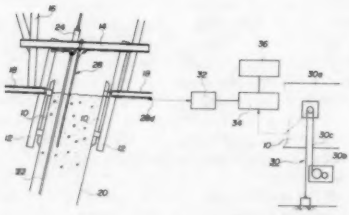
Kenji Tsuruta, Nagareyama, Japan, assignor to Ohbayashi-Gumi, Ltd., Osaka, Japan

Filed Jun. 23, 1986, Ser. No. 877,972

Claims priority, application Japan, Nov. 1, 1985, 60-244086; May 19, 1986, 61-112734

Int. Cl.[4] G01N *3/00*

U.S. Cl. 374—102 **11 Claims**



1. In a slip form process in which a slide form is moved upward after concrete poured therein has set to a degree to provide a sufficient strength, a method of measuring the strength of said concrete comprising the steps of:

measuring a position of said slide form by an altimeter

measuring a temperature of said concrete by a temperature sensor movable with said slide form and inserted into said concrete, said temperature sensor having arranged in an axial direction thereof a plurality of spaced-apart measuring elements separated from each other by a predetermined distance and adapted to operate when said slide form is moved upward by said predetermined distance, whereby the temperature of a particular point of said concrete is measured in sequence by said plurality of measuring elements;

calculating an integral of the temperature over time of said concrete within said slide form, by an arithmetic unit on the basis of data given by said temperature sensor and said altimeter; and

determining strength of said concrete based on said integral.

4,715,727

NON-INVASIVE TEMPERATURE MONITOR

Kenneth L. Carr, Harvard, Mass., assignor to M/A-Com, Inc., Burlington, Mass.

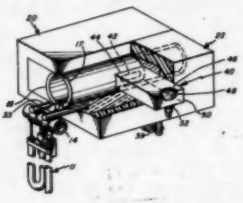
Filed Jul. 5, 1984, Ser. No. 627,761

Int. Cl.[4] A61N *5/02; G01J 5/00*

U.S. Cl. 374—122 **12 Claims**

1. A temperature appparatus used in association with a guided wave means that is adapted for microwave heating, from a microwave heating source, of a substance that is absorptive at microwave frequencies and that is held in retaining means that is transparent at microwave frequencies, both said substance and said retaining means therefor being enclosed by said guided wave means, said apparatus comprising; a length of waveguide, means defining a coupling aperture in said guided

wave means, means supporting said length of waveguide with one end thereof about said coupling aperture, a microwave radiometer detection circuit, means coupling from the length of waveguide to the detection circuit, wherein said microwave heating is at one frequency and the detection is at another frequency, and wherein said microwave heating and microwave detection are at different frequencies, said coupling aperture having a cross-sectional area less than the waveguide cross-sectional area, the coupling aperture being sufficiently small in comparison to the waveguide cross-section so as to leave the heating characteristics of the guides wave means substantially undisturbed.



4,715,728

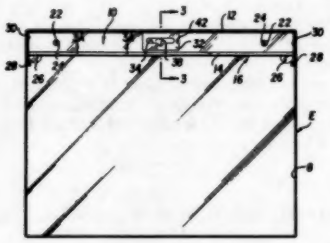
TAMPER EVIDENT MULTI-PURPOSE ENVELOPE

Nicholas Sfikas, 29 Widewaters La., Pittsford, N.Y. 14534

Filed Jun. 24, 1987, Ser. No. 65,855

Int. Cl.[4] B65D *33/10, 33/14*

U.S. Cl. 383—9 **27 Claims**



1. A substantially planar multipurpose envelope for use in a multi-ringed notebook binder comprising:

(a) a first substantially planar hinged flap normally positioned in the place of said envelope and hingedly movable out of the plane of said envelope;

(b) said first flap having first ring binder mounting means for supporting said envelope in a multi-ringed binder when said first flap is positioned out of the plane of said envelope;

(c) said first flap having a second hinged flap integral therewith and contained therein and normally positioned in the plane of said first flap and hingedly movable out of the plan of said first flap;

(d) said second flap including hanger mounting means for hanging said envelope up when said second flap is positioned outside of the plane of said first flap; and

(e) said second flap being independently pivotable of said first flap.

4,715,729

ROLLER BEARING FOR INFINITE RECTILINEAR MOTION

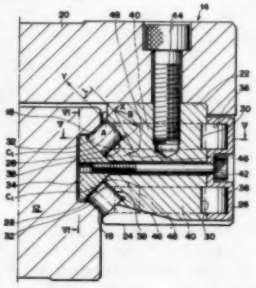
Kazuhiko Tanaka, Yokohama, Japan, assignor to Nippon Thompson Co., Ltd., Tokyo, Japan

Filed Feb. 11, 1987, Ser. No. 13,563

Claims priority, application Japan, Aug. 19, 1986, 61-191969

Int. Cl.[4] F16C *29/06*

U.S. Cl. 384—44 **6 Claims**



1. A roller bearing for an infinite rectilinear motion comprising:

a long truck rail (12) in which an inclined surface formed in a part of an outside wall surface is used as a truck surface (18);

a slide unit (14) which rides over said truck rail (12) and in which a truck surface (28) is formed at a location which faces said truck surface (18);

a number of cylindrical rollers (32) arranged between the truck surface (18) of said truck rail (12) and the truck surface (28) of said slide unit (14) on the basis of a parallel roller type;

a truck groove (38) including said truck surface (28);

an infinite circulating passage for said cylindrical rollers (32) including said truck groove (38); and

said truck groove (38) and said infinite circulating passage being formed in said slide unit (14); characterized in that

side plates (24) are attached to both end portions of the slide unit (14), within each of which plates (24) a direction change passage (40) being communicated with the truck groove (38) and being located in the same horizontal plane as the truck groove (38) is formed;

a twisting passage (46) is formed between said direction change passage (40) and said truck groove (38), in which twisting passage (46) each of the cylindrical rollers (32) moves so as to be gradually twisted until a central axis (C_1) of the cylindrical roller (32) is located in a vertical direction, and at the same time, the cylindrical roller (32) moves from the truck groove (38) into an unloaded region so as to be shifted;

and in a cross section which is perpendicular to a slide direction of the bearing, a center of curvature (B) of said twisting passage (46) is located in a region which is contained by an extension line (X) of the truck surface (18) of the truck rail (12) and an extension line (Y) of an end surface of the roller in the outside of the truck rail (12).

4,715,730

LINEAR MOTION PILLOW BLOCKS INCLUDING SELF-ALIGNING FEATURES

Robert E. Magnuson, Greenbrook, N.J., assignor to Lee Controls, Inc., Piscataway, N.J.

Filed Mar. 26, 1986, Ser. No. 844,366

Int. Cl.[4] F16C *29/04, 29/12*

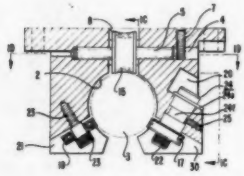
U.S. Cl. 384—52 **15 Claims**

1. A pillow block having an outer surface and comprising in

combination a primary bore having an elongated principal axis constructed to be slideably accommodated on a cylindrical primary shaft, and means for self-adjusting the position of said pillow block on said shaft, wherein said self-adjusting means comprises in combination:

at least one slot which passes through said pillow block between an outer surface thereof and said primary bore;

an axle supported in said slot and extending in a plane normal to the principal axis of said primary bore;



at least one roller, mounted in said slot in rotatable relation to said axle, said roller disposed to make tangential contact with said cylindrical primary shaft and constructed for at least slight rotation about said axle in response to slideable movement of said pillow block on said primary shaft;

wherein said roller is a ball bearing roller annular in form and having a concave sectional shape which conforms to said cylindrical primary shaft.

4,715,731

GAS BEARING

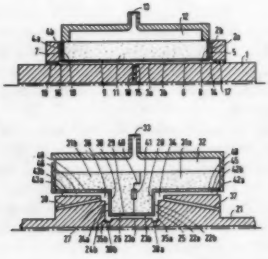
Gabriel Tittizer, Rösrath-Hoffnungstal, Fed. Rep. of Germany, assignor to Interatom GmbH, Bergisch Gladbach, Fed. Rep. of Germany

Filed Jun. 6, 1986, Ser. No. 871,703

Claims priority, application Fed. Rep. of Germany, Jun. 10, 1985, 3520717; Aug. 26, 1985, 3530437

Int. Cl.⁴ F16C *32/06, 33/06*

U.S. Cl. 384—100 **18 Claims**



1. Gas bearing and shaft assembly, comprising means for supporting the shaft in radial and axial directions in the form of complementary sets of guiding surfaces formed on the gas bearing and the shaft being mutually spaced apart defining bearing gaps therebetween, at least one guiding surface of each of said sets being a porous gas passage surface, a thin-porous layer adjoining said gas passage surface, a component having a given region disposed upstream of said gas passage surface in flow direction of gas fed under pressure through said component to said gas passage surface and said component having other porous gas-permeable regions, said gas passage surface and said thin porous layer together being denser than said other gas-permeable regions of said component and producing a pressure drop at said thin porous layer substantially greater than at said other gas-permeable regions, and gas outlet paths in communication with said bearing gaps within the bearing.

4,715,732

BEARING ASSEMBLIES FOR MOTORS

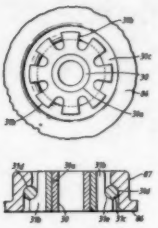
Anthony J. Sanders, Darlington, England, assignor to Black & Decker Inc., Newark, Del.

Filed Oct. 29, 1986, Ser. No. 924,635

Claims priority, application United Kingdom, Oct. 31, 1985, 8526837

Int. Cl.⁴ F16C *37/00, 27/06, 33/02;* **H02K** *5/16*

U.S. Cl. 384—320 **16 Claims**



1. A bearing assembly for a shaft, comprising:

a mounting sleeve having a longitudinal bore;

a series of spaced, external, axial, outwardly extending fins on said sleeve;

a bearing mounted in said bore;

each of said fins being of a smaller height over one part of its axial length and being of a greater height over another part of its axial length;

an annular mounting member; and

a seating for said annular mounting member formed at a junction between said one part and said another part of the axial length of each of said fins

6. An electric motor assembly, comprising: a stator defining a central longitudinal axis; an armature having a shaft extending along said axis, said shaft being rotatable on said axis;

a bearing in which said shaft is journalled;

a heat sink having a bore therein, said bearing being disposed in said bore;

said heat sink comprising a sleeve having a plurality of external fins extending outwards with respect to said axis; and

an armature mounting member in which said heat sink is supported via a ring, said ring encircling and seating against said fins and spacing said heat sink from said armature mounting member.

4,715,733

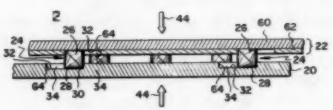
ANTIFRICTION THRUST BEARING FOR ORBITAL MOTION

Jerry A. Rood, Onalaska, Wis., assignor to American Standard Inc., New York, N.Y.

Filed May 21, 1986, Ser. No. 865,494

Int. Cl.⁴ F16C *19/00;* **F01C** *1/02;* **F16H** *37/00*

U.S. Cl. 384—445 **14 Claims**



1. An antifriction thrust bearing for use between two generally facing surfaces undergoing relative orbital motion, said bearing comprising a plurality of rollers each having two opposing, generally conical shaped surfaces defined by two coaxially aligned cones, joined at their base, and each having an apex at opposite ends of each of said rollers with each apex having a vertex angle that is less than or generally equal to a

right angle of 90 degrees, and with each conical surface lying in rolling line contact with one of the facing surfaces, so that said rolling line contact sweeps a circular area on each of said facing surfaces as they orbit relative to each other.

4,715,734
PLATEN ADJUSTING MECHANISM

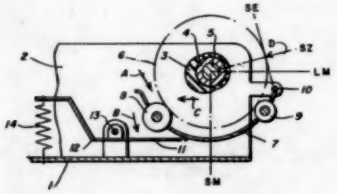
Gerhard Pamler, Nuremberg, Fed. Rep. of Germany, assignor to Ta Triumph-Adler Aktiengesellschaft, Nuremberg, Fed. Rep. of Germany

Continuation of Ser. No. 667,578, Nov. 2, 1984. This application Oct. 6, 1986, Ser. No. 915,997

Claims priority, application Fed. Rep. of Germany, Nov. 5, 1983, 3340046

Int. Cl.[4] B41J *11/20*

U.S. Cl. 400—56 **3 Claims**



1. Automatic platen adjusting mechanism for a typewriter or like machine comprising

a platen having a shaft

a frame having side plates,

elastic bearings supported in said side plates for supporting said platen shaft and configured to yield in a straight line direction perpendicular to a typing plane which includes a line against which types impact against said platen,

a paper guide trough rotatably supporting front and rear pressure rolls on axes parallel to the axis of said platen shaft and forward and rearward respectively of a vertical line through said platen shaft axis,

means biasing said paper guide trough to urge said pressure rolls into engagement with said platen, and

means secured to said side plates and positioned relative to said platen to cause paper introduced into said guide trough between said platen and pressure rolls to exert pressure against said platen resulting in the yielding of said elastic bearings in said straight direction a distance equal to the thickness of the paper, said last named means comprising means on said side plate for pivotally mounting said paper guide trough on an axis parallel to the axis of said platen shaft,

said paper guide trough pivot axis lying in said typing plane forward and above the axis of said front pressure rolls.

4,715,735
DUAL MODE PRINTING APPARATUS WITH MULTIPLE PRINT RIBBON CASSETTES

Susumu Kuzuya, and Mamoru Imaizumi, both of Nagoya, Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Oct. 24, 1984, Ser. No. 664,339

Claims priority, application Japan, Oct. 31, 1983, 58-204357; Oct. 31, 1983, 58-204358; Oct. 31, 1983, 58-204359; Oct. 31, 1983, 58-204360

Int. Cl.[4] B41J *3/54, 35/28*

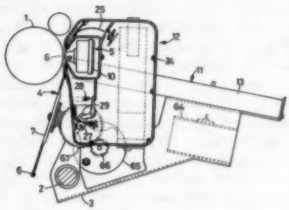
U.S. Cl. 400—82 **5 Claims**

1. A printing apparatus comprising:

first printing means for type-printing characters including a daisy-type wheel having type elements which are disposed at the free ends of multiple spokes and abuttable on a platen, and a hammer located at the back of said daisy-type wheel and opposite to said platen so that said type elements are selectively located between said hammer and said platen for striking said type elements against said platen;

second printing means including a plurality of print elements which are selectively activated for printing characters by a dot matrix;

a single common carrier which reciprocates along a print line defined on said platen, said first and second printing means being supported on said single common carrier and said second printing means having a second print point which is spaced away from a first print point of said daisy-type wheel of said first printing means in a direction along the surface of said platen parallel to said print line;



a first ribbon cassette accommodating a first ribbon for use by said first printing means, said first ribbon cassette being disposed in a plane substantially parallel to said print line;

a second ribbon cassette accommodating a second ribbon for use by said second printing means, said second ribbon cassette being disposed in a plane substantially perpendicular to said print line; and

means for controlling said first and second printing means, said single common carrier, and said first and second ribbon cassettes to effect a mixed type and dot matrix printing in the same line of printing.

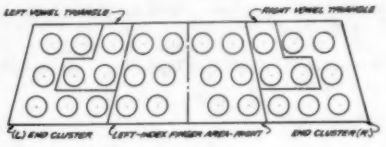
4,715,736
PROCESS FOR DETERMINING OPTIMUM KEYBOARD FORMATS FOR A GIVEN LANGUAGE

Roger J. McGunnigle, New York, N.Y., assignor to FWM Enterprises, Inc., Somers, N.Y., a part interest

Division of Ser. No. 676,610, Dec. 3, 1984, Pat. No. 4,613,247, which is a continuation of Ser. No. 401,913, Jul. 26, 1982, abandoned. This application Apr. 9, 1986, Ser. No. 833,811

Int. Cl.[4] B41J *5/10*

U.S. Cl. 400—484 **16 Claims**



1. A process for determining optimum keyboard formats for a given language, comprising:

(a) establishing a fixed array of an upper row, a middle row and a lower row of key members with ten key members in each row, thereby defining a keyboard having a left-hand side and a right-hand side;

(b) defining sets of key members whereby each key member in a set is to be actuated by a certain finger of a keyboard operator after placing the operator's first to fourth fingers of each hand at a rest position on the first to fourth and the seventh to tenth key members of the middle row, counting from left to right;

(c) consecutively ordering each of the key members of said keyboard according to the relative ease of finger actuation

by the operator when the operator's fingers start at said rest position, alternating between each hand for each of the first to fourth fingers, thereby establishing a different finger priority number for each of the key members;

(d) determining the frequency of use of characters including letters and punctuation marks, in words and sentences of said language;

(e) assigning a first frequency number corresponding to the character most frequently used in said language;

(f) continuing to assign consecutive frequency numbers to said characters from the character second most frequently used to the least frequently used character in said language;

(g) selecting one of a plurality of keyboard formats, said formats including a scientific keyboard format defined by

(h) matching each of the priority numbered key members with a corresponding frequency numbered character, thereby establishing a primary format whereby the ten most frequently used letter characters in said language are matched to the key members of the middle row;

(i) assigning only consonant letter characters to the middle row key members actuatable by the index fingers of the operator, by exchanging placement of a vowel letter character matched to the index finger key members with a consonant letter character matched to another middle row key member and having a frequency of use close to that of the vowel letter character which it replaces;

(j) assigning the four most frequently used vowel letter characters in said language to the key member group including the second, third, eighth and ninth key members of the middle row, counting from left to right, by exchanging placement of another kind of character matched to said key member group with a vowel letter character matched to a key member outside said key member group and having a frequency of use close to that of the other kind of character which it replaces;

(k) assigning vowel letter characters other than said four most frequently used ones to the third and eighth key members of said upper row, counting from left to right; and

(l) exchanging the placement of consonant letter characters with one another along the middle row and exchanging the placement of vowel letter characters with one another along said middle row to create a word-like sound of at least four letter characters for association with each hand thereby facilitating easy memorization of the letter character layout in said scientific keyboard format.

4,715,737

PRINTER WITH PAPER FEED ROLLER DISENGAGEMENT MECHANISM

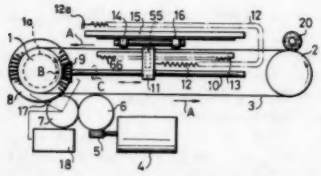
Fumihasa Hori, Tamayama, Japan, assignor to Alps Electric Co., Ltd., Japan

Filed Jul. 6, 1983, Ser. No. 511,512

Claims priority, application Japan, Jul. 7, 1982, 57-117027; Jul. 7, 1982, 57-117028

Int. Cl.⁴ B41J *19/76*

U.S. Cl. 400—569 **2 Claims**



1. A printer comprising a paper feed roller, an intermediate gear coupled with said paper feed roller and having a spur gear section on an outer circumferential surface thereof, and a paper feed cam having an axis extending perpendicularly to a plane including an axis of said intermediate gear and having on its outer circumferential surface a helical tooth for meshing engagement with said spur gear section of the intermediate gear, said paper feed roller being angularly movable in a paper feed mode for a predetermined angular interval through said intermediate gear in response to angular movement of said paper feed cam, said paper feed cam having in the outer circumferential surface thereof a gap for disengagement of said tooth with said intermediate gear in a non-feed mode.

4,715,738

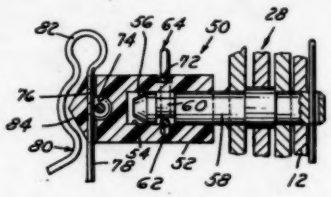
CARBURETOR THROTTLE LEVER/SPEED CONTROL CONNECTOR

Raymond Stocker, West Bloomfield, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Dec. 22, 1986, Ser. No. 945,147

Int. Cl.⁴ F16B *21/18*

U.S. Cl. 403—24 **4 Claims**



1. A universal connector for interconnecting a pair of relatively movable members for actuation of one in response to actuation of the other, the connector including an elongated body having an axial passage open at one end, a pin type pivot shaft fixed for rotation with one of the members and having an end projectable into the passage with an annular groove formed thereon, a flexible essentially U-shaped spring retaining clip having a pair of laterally spreadable legs, the body having an opening extending therethrough essentially at right angles to its longitudinal axis for receiving one leg of the retaining clip therethrough, the other leg surrounding an outer peripheral portion of the body in a hook-like manner to springedly retain the clip to the body, the axis of the opening being aligned with and intersecting the shaft groove upon assembly of the shaft of the body, the opening being oblong in cross-section with an inner diameter less than and an outer diameter greater than that of the groove whereby the one leg is received in and passes through the groove upon insertion through the opening to lock the shaft of the body against axial relative movement while permitting rotational movement therebetween, a camming movement of the one leg laterally outwardly in the opening to the outer diameter of the opening moving the one leg laterally out of the groove permitting axial separation between the shaft and connector body, and means connecting the opposite end of the body to the other moving member to permit the body to rotate freely upon the shaft to translate a linear movement of one member into an arcuate and linear movement of the other.

4,715,739

CONNECTION BETWEEN A PLASTICS QUILL SHAFT AND A METAL ELEMENT

Christoph Rüegg, Basel; Peter Voirol, Binningen; Willi Fuchs, Basel, and Hans U. Meister, Riehen, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Feb. 10, 1982, Ser. No. 347,403

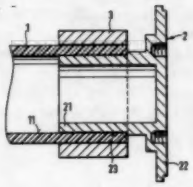
Claims priority, application Switzerland, Feb. 18, 1981, 1070/81

Int. Cl.⁴ F16B *4/00*

U.S. Cl. 403—30 **7 Claims**

1. A connection between a fiber reinforced plastic torque transmission shaft and a torque input fitting wherein said trans-

mission shaft is reinforced with high rigidity fibers oriented in an angular range of from 0° to ±30° to the shaft axis, said connection comprising a first metal ring forming part of the input fitting which extends into an end zone of the transmission shaft and a second metal ring which extends over said end zone of the transmission shaft, said first and second metal rings frictionally clamping the wall of the transmission shaft in its



end zone therebetween, the clamping stresses in said first and second metal rings being so matched that the mean diameter of the transmission shaft in the clamped end zone is substantially equal to that in the adjacent area, and the said first and second metal rings consisting of a material whose coefficient of thermal expansion circumferentially differs by not more than about 20% from that of the transmission shaft.

4,715,740

CLOSURE SYSTEM FOR A LONGITUDINALLY DIVIDED CABLE SLEEVE

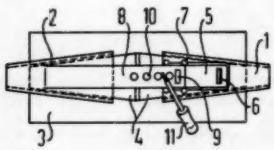
Klaus Pichler, Otterfing, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Oct. 30, 1986, Ser. No. 924,978

Claims priority, application Fed. Rep. of Germany, Nov. 28, 1985, 3542153

Int. Cl.⁴ F16G *11/02*

U.S. Cl. 403—313 **14 Claims**



1. In a closure system for longitudinally closing a divided cable sleeve of plastic, said cable sleeve having two undercut beads extending along a parting line, said beads being expanded wedge-like from the sleeve ends towards the middle of the sleeve and said system including a pair of clamping rails having a wedge-shape and engaged with said beads to hold the beads in tight engagement with means for fixing the clamping rails in a final closed position, the improvements comprising said means for fixing including a resilient strip extending from a broad end of one of the wedge-shaped rails in a longitudinal direction, said strip having a first part for a latch mechanism at its end and having a draw on aid in the form of a plurality of free standing pegs lying at intervals following one another, a second opposed rail having a longitudinally extending guide channel for receiving the resilient strip of said first rail, said guide channel having a second part of the latch mechanism arranged at an end opposite to the wide end.

4,715,741

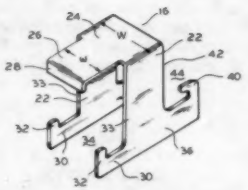
CLIP FOR COUPLING SHELF ASSEMBLIES

Irwin Kulbersh, Skokie, Ill., assignor to Amco Corporation, Chicago, Ill.

Filed Jul. 21, 1986, Ser. No. 887,250

Int. Cl.⁴ A47B *9/00*

U.S. Cl. 403—389 **13 Claims**



1. A device for coupling together shelves located at the same level in adjacent shelf assemblies comprising two parallel spaced-apart sidewalls; a top wall connected to said sidewalls and disposed in a plane perpendicular to said sidwalls; a tongue extending outwardly from said top wall in a plane parallel to the plane of the top wall; a first pair of projections extending from said sidwalls below and parallel to the direction of extension of said tongue to form with said tongue and said sidewalls a first shelf receiving space, said first shelf receiving space being shaped and proportioned to enable said device to be pivoted into and out of coupling engagement with one of said shelves; and a second pair of projections extending from said sidewalls in a direction opposite to that of said first pair of projections to form with said sidewalls a second shelf receiving space.

4,715,742

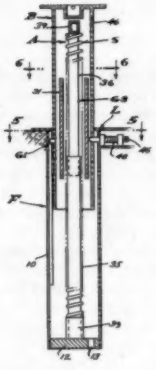
MANUALLY DEPRESSIBLE AUTOMATICALLY DEPLOYABLE SPRING BALANCED BOLLARD

Harry D. Dickinson, 1681 Larco Way, Glendale, Calif. 91302

Filed Mar. 17, 1986, Ser. No. 840,389

Int. Cl.⁴ E01F *13/00*

U.S. Cl. 404—6 **18 Claims**



1. A manually depressible spring balanced bollard type trafficway barrier for arresting vehicles, and including;

a below grade level foundation of substantial depth, having a grade level opening at its upper end and having a bottom support,

a spring lift means centered upon the bottom support and supporting a bollard in a position of balanced equilibrium between a depressed position and an extended position,

the bollard being of tube form entered through the founda-

tion grade level opening and centered over and carried by the spring lift means in said balanced condition extending upward from the grade level,

and releasable lock means carried by the foundation and engaged with spaced stops on the bollard, one stop engageable to hold when the bollard is depressed to grade level and the other stop engageable to hold the bollard when extended by the lift means, whereby the spring lift means stores potential energy by depression of the bollard to grade level and subsequently released for transfer into kinetic energy and assisted by inertia to lift the bollard above the position of balanced equilibrium and to the other stop.

4,715,743

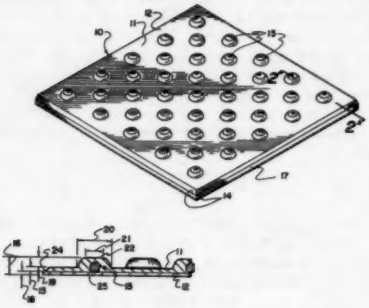
MOBILITY GUIDE TILE FOR VISUALLY HANDICAPPED

Donald W. Schmanski, 400 W. King St., Carson City, Nev. 89701

Filed Jun. 13, 1986, Ser. No. 873,954

Int. Cl.[4] E01F *9/00*; **E01C** *5/20, 5/22*; **G09B** *21/00*

U.S. Cl. 404—9 **21 Claims**



1. A tile for positioning on walkways, crosswalks and other areas of pedestrian traffic for providing direction and warning to visually handicapped persons, said tile comprising:

a flat plate comprised of a single layer of flexible, polymer composition with a top and bottom surface and including a chamfered edge around the periphery of the plate tapering to a lesser thickness at the extreme edge thereof;

raised bumps coupled and formed integrally with the top surface of the plate and of the same flexible, polymer composition, and projecting upward therefrom and being configured as truncated structure having a larger base attached at the top surface of the plate and tapering to a narrower top which includes a substantially flat, contacting surface adapted to withstand repeated contact with footware without significant wear;

said tile including a uniform adhesive layer applied at the bottom surface.

4,715,744

FLOATING BREAKWATER

Alvin Richey, 2044 N. Manor Dr., Erie, Pa. 16505

Filed Dec. 12, 1986, Ser. No. 941,045

Int. Cl.[4] E02B *3/06*

U.S. Cl. 405—26 **11 Claims**

1. A floating breakwater comprising an elongated hollow body having a top, bottom, first side, second side, first end and a second end attached together forming a water tight body,

a plate-like keel fixed to said bottom of said body and extending downwardly and extending from one end of said body to the other,

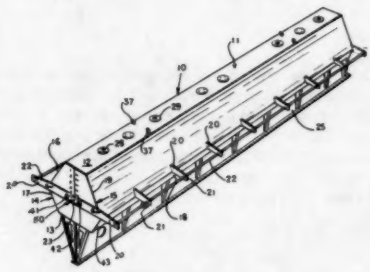
first outrigger means attached to said first side and extending outwardly therefrom,

second outrigger means attached to said second side of said body and extending outwardly therefrom,

first swivel means is pivotally attached to said first end of said breakwater,

second swivel means pivotally attached to said second end of said breakwater,

said swivel means having means thereon to attach said swivel means to an anchor line whereby said breakwater



can be anchored in place along a shoreline for decelerating waves,

said hollow body having bulkheads therein attached to said first side of said body, to said second side of said body, to said bottom of said body dividing said body into a plurality of compartments, whereby a water ballast in said breakwater is prevented from flowing from one end thereof to the other to change the weight thereof,

said bulkheads having laterally spaced openings through them allowing water in said breakwater to redistribute itself in said body at a controlled rate to restrain the movement of said breakwater,

said top of said body has spaced openings therein and covers for said spaced openings whereby ballasts can be introduced into and removed from said breakwater body.

4,715,745

GROUND ANCHOR SYSTEM

Ernst Reichert, Pöring, and Karl Schütt, Langenfeld, both of Fed. Rep. of Germany, assignors to Stump Bohr GmbH, Ismaning, Fed. Rep. of Germany

PCT No. PCT/DE85/00241, § 371 Date May 5, 1986, § 102(e) Date May 5, 1986, PCT Pub. No. WO86/00655, PCT Pub. Date Jan. 30, 1986

PCT Filed Jul. 12, 1985, Ser. No. 858,185

Claims priority, application Fed. Rep. of Germany, Jul. 13, 1984, 3425941

Int. Cl.[4] E02D *5/76*

U.S. Cl. 405—262 **11 Claims**

1. A ground anchor system comprising:

an abutment at a side of a ground surface opposite the ground;

an elongated main tension member having a subterranean portion of its length extending into and adapted to be anchored in the ground below said surface, said elongated main tension member having a free portion of its length between said surface and said abutment and being tensioned against said abutment;

an anchor body in the ground at a foot of said main tension member in the ground remote from said abutment, said main tension member being fixed to said anchor body;

a sleeve spacedly surrounding said main tension member over at least said subterranean portion and fixed to said anchor body;

a compression mass surrounding said sleeve, said subterranean portion and said anchor body in direct contact with said anchor body and said sleeve and with the surrounding ground over the length of said subterranean portion, said sleeve separating said subterranean portion of said tension member from direct contact with said mass; and

at least one auxiliary tension member extending to said anchor body, passing through said mass outwardly of said sleeve and tensioned against said abutment.

4,715,746

METHOD OF STRENGTHENING GEOLOGICAL FORMATIONS

Max Mann, Odenthal, and Manfred Kapps, Bergisch-Gladbach, both of Fed. Rep. of Germany, assignors to Bergwerksverband GmbH, Essen and Bayer Aktiengesellschaft, Leverkusen, both of, Fed. Rep. of Germany

Continuation of Ser. No. 819,075, Jan. 15, 1986, abandoned. This application Apr. 15, 1987, Ser. No. 38,375

Claims priority, application Fed. Rep. of Germany, Jan. 30, 1985, 3502997

Int. Cl.[4] E02D *3/12*

U.S. Cl. 405—264 **8 Claims**

1. A process for strengthening a geological formation in an underground working or mine by introducing a reaction mixture which contains only organic foam-forming components and optionally water comprising

(a) a polyisocyanate component and

(b) a polyol component which comprises a mixture of

(i) an organic polyhydroxyl compound with a hydroxyl number of about 100 to 800 and

(ii) a monovalent alcohol having a molecular weight of about 32 to 600 wherein component (ii) is present in an amount of about 0.01 to 20% by weight, based on the total quantity of component (b)

into at least one bore-hole located in said formation and allowing components (a) and (b) to react to form a polyurethane.

4,715,747

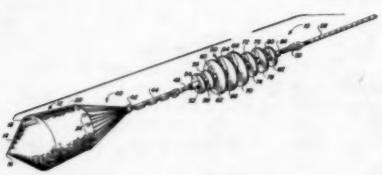
AIR MOTIVATED CONDUIT PROVER APPARATUS

Robert N. Behrens, 4802 W. Laurel La., Glendale, Ariz. 85304

Filed Jun. 20, 1986, Ser. No. 876,413

Int. Cl.[4] F16L *1/00*

U.S. Cl. 405—303 **11 Claims**



1. Air driven apparatus for proving and cleaning a conduit, comprising, in combination:

flexible piston means movable in the conduit;

flexible mandrel means secured to and movable with the piston means in the conduit including

cable means secured to the piston means,

a plurality of spacers secured to and movable with the cable means,

a plurality of plates alternating with the plurality of spacers and secured to and movable with the cable means;

rope means secured to the cable means of the mandrel means and movable with the piston means and the mandrel means through the conduit; and

air means for moving the piston means, the mandrel means, and the rope means through the conduit to prove the integrity of the conduit.

4,715,748

PROCESS AND EQUIPMENT FOR PNEUMATIC AND HYDRAULIC TRANSPORT OF BULK MATERIALS THROUGH PIPES

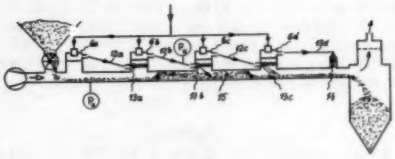
Wolfgang Krambrock, Vogt, Fed. Rep. of Germany, assignor to AVT Anlagen- und Verfahrenstechnik GmbH, Vogt, Fed. Rep. of Germany

Continuation of Ser. No. 781,135, Sep. 27, 1985, abandoned. This application Apr. 6, 1987, Ser. No. 35,264

Claims priority, application Fed. Rep. of Germany, Sep. 29, 1984, 3435907

Int. Cl.[4] B65G *53/66*

U.S. Cl. 406—11 **6 Claims**



1. Process for pneumatic or hydraulic transport of bulk material in a conveying direction through a pipeline by means of over or underpressure, with a normal pressure drop existing in the pipeline when no plug of bulk material exists in the pipeline, comprising: monitoring the pressure prevailing at a plurality of successive selected points along the pipeline; continuously providing a plurality of sources of a pure gas or liquid each at a pressure corresponding to the pressure prevailing at an associated one of the selected points along the pipeline; and supplying the pure gas or liquid from each source to the selected point along the pipeline which next succeeds, in the conveying direction, the associated selected point for that source, only when the pressure drop in the pipeline between the selected point associated with that source and the succeeding selected point exceeds the normal pressure drop.

4,715,749

PNEUMATIC TRANSPORT CONVEYOR

Hans Hoppe, Vogt; Dieter Heep, Bergatreute; Norbert Eberhard, Ertingen, and Werner Miller, Ravensburg, all of Fed. Rep. of Germany, assignors to Waeschle Maschinenfabrik GmbH, Ravensburg, Fed. Rep. of Germany

Filed Oct. 9, 1985, Ser. No. 785,844

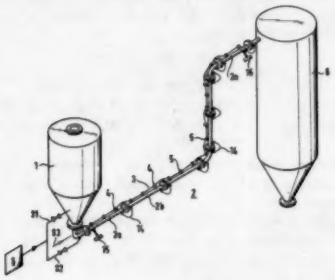
Claims priority, application Fed. Rep. of Germany, Oct. 12, 1984, 3437560

Int. Cl.[4] B65G *53/66*

U.S. Cl. 406—14 **7 Claims**

1. A pneumatic conveying system for bulk material comprising a transport conduit through which said bulk material is pneumatically transported, said transport conduit comprising a plurality of tubular sections connected end to end, each section comprising a rigid outer tube and an elastic tube having an outer diameter smaller than the inner diameter of said outer tube, and a secondary gas line paralleling said transport conduit, check and relief valves connecting said secondary gas line to the interior of the inner tube at selected intervals, said check

and relief valve communicate through the walls of said outer and inner tube to be responsive to a different in pressure between that within the inner tube and that within said secondary gas line to divert gas to or from the interior of said inner tube to enhance the transport of said bulk material therethrough, said elastic inner tube being hermetically sealed at each end to said outer tube and to each of said check and relief valves to form an enclosed chamber between said inner and outer tubes,



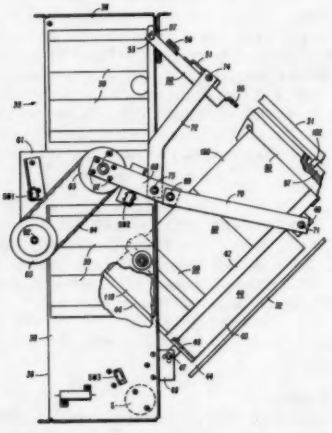
hermetically separated from the interior of said inner tube and from said secondary gas line, a bridging tube connecting the chambers of each one said conduit sections serially with the chamber of each of the next adjacent conduit sections, the chambers of at least the terminal conduit sections in said transport conduit being opened to atmosphere to permit air at atmospheric pressure to move serially through said chembers from one end of said transport conveyor to the other.

4,715,750

LARGE CAPACITY SINGLE OVERHEAD PNEUMATIC TUBE SYSTEM

Michael J. Podoll, Marion, and Peter J. Jensen, Center Point, both of Iowa, assignors to LeFebure Corporation, Cedar Rapids, Iowa

Filed Jun. 19, 1986, Ser. No. 875,923
Int. Cl.[4] B65G *51/26*
U.S. Cl. 406—111 **9 Claims**



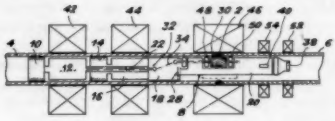
1. In a pneumatic tube system having a pair of terminals interconnected by an overhead rectangular tube, a captive, generally rectangular carrier having upper and lower ends for passage between the terminals, one of the terminals including a front wall and an upright rectangular carrier receiver normally enclosed within said one terminal for receiving the carrier from and dispatching the carrier into the tube, the receiver having an upper opening and an inner carrier platform supporting the lower end of the carrier when in the receiver, the receiver constituting a drawer including said front terminal wall and slidable in one direction relative to said one terminal from its closed to its open position in order to expose the upper end of the carrier when supported on the carrier platform and in an opposite direction relative to said one terminal from its open to its closed position in order to return the carrier to within said one terminal, the carrier lower and upper ends constituting covers slidable with respect to the carrier in said directions of movement of the receiver, means for retaining the cover of the upper end of the carrier in said one terminal upon movement of the receiver between its closed and its open positions, whereupon the carrier is opened and closed upon movement of the receiver between its closed and open positions.

4,715,751

DEVICE FOR THE INTERNAL MACHINING OF A TUBE

Claude Rigoulot, 71100 Chalon Sur Saone, France, assignor to Commissariat a l'Energie Atomique, Paris, France

Filed Sep. 19, 1986, Ser. No. 909,466
Claims priority, application France, Sep. 27, 1985, 85 14351
Int. Cl.[4] B23C *3/02*
U.S. Cl. 409—139 **11 Claims**



1. A device for the internal machining of a tube, wherein the device comprises a mobile assembly which can be positioned in the tube and has a first part with at least two bearings to provide a centering support of the mobile assembly in the tube and provided with two rotors which freely rotate along a longitudinal axis of said mobile assembly, and a second part having a machining tool mounted so as to rotate freely along a longitudinal axis so that it can machine the interior of the tube, means for linking the second part to the first part in radial sliding relationship to enable said second part to translate radially along a radial axis of said tube relative to said first part, one of the said rotors driving the machining tool via a transmission shaft and the other of the said rotors rotating the second part and a fixed assembly arranged around the tube and comprising first and second magnetic devices, each magnetic device being centered respectively substantially about the median transverse plane of each rotor and each magnetic device establishing a rotary magnetic field which rotates a respective one of said two rotors on the longitudinal axis of the mobile assembly and a third magnetic device centered substantially about the median transverse plane of the cutting tool and establishing a rotary magnetic field able to displace the second part radially with respect to the first part, whilst rotating in phase with the second part.

4,715,752

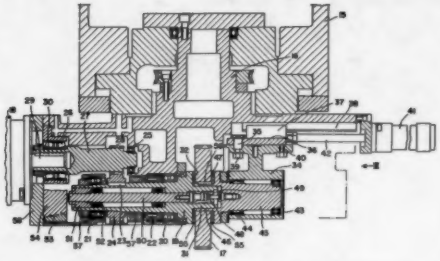
CUTTER HEAD IN A MACHINE TOOL

Masayuki Oura, Kyoto, Japan, assignor to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 17, 1987, Ser. No. 15,345
Claims priority, application Japan, Mar. 11, 1986, 61-33868[U]
Int. Cl.[4] B23Q *5/04*
U.S. Cl. 409—232 **1 Claim**

1. A cutter head in a machine tool comprising a cutter head main body, a cutter spindle that is rotatably supported by said cutter head main body and adapted to be rotatably driven, a cutter support carried by said cutter head main body so as to be

rotatable about an axis orthogonal to the cutter spindle axis and movable along the axial direction of said cutter spindle, a support shaft that is rotatably supported by said cutter support so as to be coaxial with said cutter spindle, a collet section having an expansible and contractible diameter so that the tip end of said cutter spindle can be fitted in the inner circumference of the collet section resulting in expansion of the diameter



and a cutter can be fitted around the outer circumference of the collet section, said collet section being formed at the tip end of said support shaft, and clamp means for clamping the cutter fitted around the outer circumference of said collet section by bringing said cutter spindle and said support shaft close to each other under the state where the tip end of said cutter spindle is fitted in the collet section of said support shaft.

4,715,753

TOOL-HEAD/TOOL-HOLDER COUPLING

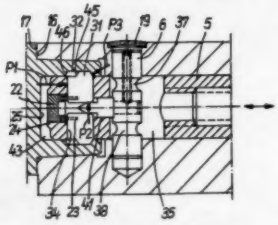
Hans Tack, Velbert, Fed. Rep. of Germany, assignor to Fried. Krupp Gesellschaft mit beschränkter Haftung, Essen, Fed. Rep. of Germany

Filed Jan. 23, 1987, Ser. No. 6,707

Claims priority, application Fed. Rep. of Germany, Jan. 25, 1986, 3602247

Int. Cl.[4] B23B *29/04, 29/34*

U.S. Cl. 409—234 **21 Claims**



1. Coupling for the connection of a tool head having a planar face and defining therewith a blind bore with a groove and a contact collar external to said bore and a tool holder having a counterface opposing said collar in a machine tool having an interchangeable tool head provided with an at least partially conical receiving pin and an annular contact collar, both cooperating with a corresponding receiving bore and an annular counterface of the tool holder, with tool holder and tool head being actuated by means of clamping elements which are themselves actuated by way of a clamping device and being locked in such a manner that the contact collar of the tool head rests against the counterface of the tool holder, the coupling comprising a clamping slide in the tool holder and arranged movably therein in longitudinal direction of the tool holder, the clamping slide having a frontal face cooperating with the planar face of the tool head in said blind bore in the tool head, radially movable clamping jaws in the front portion of said tool head, a pin fixed to the tool holder and cooperating with said clamping jaws and responsive to the clamping jaws being pushed over said pin to grip behind said groove in the receiving bore of the tool head and lock said tool head in its end position in such a manner that its contact collar rests firmly against the counterface of the tool holder.

4,715,754

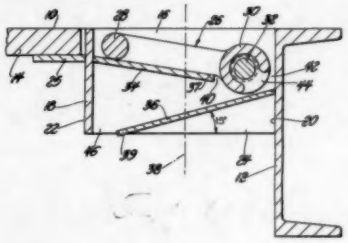
TIEDOWN ASSEMBLY

Andrew J. Scully, Macomb, Mich., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jun. 18, 1986, Ser. No. 875,899

Int. Cl.[4] B61D *45/00*

U.S. Cl. 410—107 **3 Claims**



1. In a flat bed cargo vehicle having a series of upwardly-opening pockets spaced therealong, and a cargo tie-down anchor member pivotably disposed within each pocket for swinging motion between a retracted position located entirely within the pocket and a use position extending partly out of the pocket:

the improvement wherein each pocket is defined by side walls and a bottom wall; said pocket side walls including first and second parallel flat side walls spaced from one another to define the length dimension of the pocket, and third and fourth parallel flat side walls spaced from one another to define the width dimension of the pocket; said bottom wall comprising an upper plate **(34)** and a lower plate **(36)**; said upper plate angling downwardly from the first pocket side wall to a point beyond the vertical mid plane **(38)** of the pocket; said lower plate angling downwardly from the second pocket side wall to a point beyond the vertical mid plane of the pocket, said plates having free edge areas spaced from respective ones of the second and first side walls; the plates being dimensioned so that the free edge areas of the plates overlap one another in the vertical direction; the pocket side walls having lower edges thereof no higher than the general plane of the lower plate whereby the space between the free edge of the lower plate and the first side wall forms a restriction to upwardly-moving flames that might otherwise reach the space above the cargo bed; each cargo tie-down member comprising a hub section **(30)** located above the lower plate in the space between the second side wall and the free edge of the upper plate, and a loop section **(28)** extending from the hub section; and a pivot shaft **(32)** extending through the hub section from the third side wall to the fourth side wall to form a pivot axis paralleling the first and second side walls; each cargo tie down member being swingable around the defined pivot axis between a retracted position wherein the loop section rests against the upper plate and a use position wherein the loop section extends upwardly relative to the pivot axis; each hub section having a curvilinear cross section sized to form a first water drainage clearance space **(42)** between the hub section and the associated second side wall, and a second water drainage clearance space **(40)** between the hub section and the free edge of the associated upper

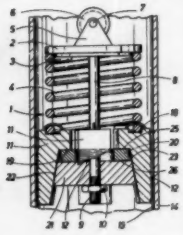
plate when the tie down member is in its use position or in its retracted position.

4,715,755

SECURING DEVICE FOR SECURING IN CAVITIES

Karl G. Hesselmar, Lerum, Sweden, assignor to AB Holmgrens Armaturfabrik, Gnosjö, Sweden

PCT No. PCT/SE85/00280, § 371 Date Mar. 18, 1986, § 102(e) Date Mar. 18, 1986, PCT Pub. No. WO86/00964, PCT Pub. Date Feb. 13, 1986
PCT Filed Jul. 15, 1985, Ser. No. 852,457
Claims priority, application Sweden, Jul. 18, 1984, 8403763
Int. Cl.[4] F16B *13/04*; E21B *23/00*
U.S. Cl. 411—39 6 Claims



1. A securing device for use in a cavity, comprising: a plurality of clamping jaws, a changeable tension body adapted to expand said clamping jaws against opposite wall portions in said cavity, said clamping jaws having engagement surfaces to be forced outwardly, and also having tension surfaces for cooperation with a tension surface of the tension body which by a displacement motion of the clamping jaws relative to the tension body is brought to adjust the clamping jaws between an inner, releasing position and an outer, expanded securing position, a spring mechanism for pressing the clamping jaws against the tension body, and a distance element positioned between the clamping jaws and the tension body, said distance element maintaining in said releasing position a predetermined distance between support surfaces of the clamping jaws and a surface of said distance element, said distance element being made of a material soluble in water such that the material is contacted with a source of water and after a certain time interval the distance element is disolved and said distance will be reduced, so as to result in said displacement motion of the clamping jaws relative to the tension body, whereby the expanded securing position will be automatically taken with a time delay from the time, when said enviromental influence begins.

4,715,756

NUT AND WASHER ASSEMBLY

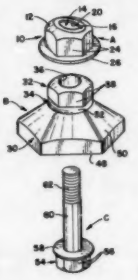
Henry F. Danico, Stoneham, and Frederick A. Hammerle, Topsfield, both of Mass., assignors to TRW Inc., Cleveland, Ohio

Continuation of Ser. No. 635,978, Jul. 30, 1984. This application Oct. 6, 1986, Ser. No. 917,231
Int. Cl.[4] F16B *33/00, 37/08*
U.S. Cl. 411—369 8 Claims

1. A fastener assembly comprising:

a washer member molded from plastic and including a skirt portion having a sealing face and a reduced diameter end portion integrally joined to said skirt portion by a collar section interposed between said skirt and end portions, a fastener receiving aperture for receiving the threaded shank of an elongated threaded fastener, said aperture extending generally centrally through said skirt portion, said end portion and said collar portion,at least the portion of said aperture associated with said skirt portion being devoid of threads;

a generally cup-shaped metal nut means having an internal open configuration generally corresponding to said end portion positioned over and enclosing said end portion and press fitted thereto for driving rotation therewith, said nut means having side walls terminating above said skirt portion and further including a threaded opening aligned with said aperture and adapted to threadedly receive the shank of an elongated threaded fastener extending through said aperture; and,



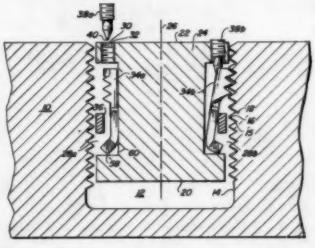
said collar section having a width substantially less than said end portion and a conformation to facilitate fracture thereof when a predetermined torque load is applied between said skirt portion and end portion for allowing said skirt portion and end portions to be rotated relative to each other.

4,715,757

ATTACHMENT APPARATUS AND METHOD FOR ATTACHING

Robert E. Edminster, Scottsdale, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Oct. 1, 1984, Ser. No. 656,800
Int. Cl.[4] F16B *35/01*
U.S. Cl. 411—411 18 Claims



1. An attachment apparatus comprising:

a device having an outward facing surface and a body formed around a common axis;

an anchor surrounding the body of said device;

a pin having a pin axis; and

a keeper positioned on the outward side of the body of said device, said keeper having

a tooth protruding outwardly from the body of said device, and

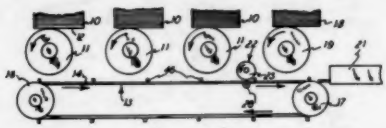
means, integral with said keeper, for receiving said pin so that upon engagement of said pin with said receiving means said pin transmits force to said keeper in a direction which causes said keeper tooth to move outwardly from the body of said device.

4,715,758

METHOD AND APPARATUS FOR ATTACHING SHEETS TOGETHER

Walter J. Stobb, Pittstown, N.J., assignor to Stobb, Inc., Clinton, N.J.

Filed Jul. 18, 1986, Ser. No. 886,606
Int. Cl.[4] B42C 9/00
U.S. Cl. 412—8 12 Claims



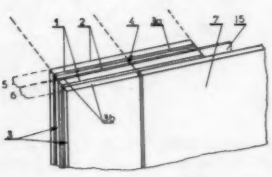
1. A method of binding sheets of paper together by stitching on the center-line of the sheets to form signatures, comprising the steps of continuously collecting the sheets in spaced-apart stacks on a support, moving said support with said stack in a path of movement and at a selected speed, positioning groups of hollow needles in radially extending positions along only one straight line on the circumference of a circular rotatable support and rotating said support to have said needles rotate at said selected speed and into piercing contact with the sheets for forming holes therein on the center-line thereof, the spacing of said groups of said needles on the circular path of rotation being in circumferential spaced-apart groups which are related to said center-lines of said stacks of sheets by a whole number to have said needles pierce said sheets only on the center-lines and at a uniformly spaced-apart positions along said center-lines of successive ones of said stacks, forcing a hardenable liquid through said hollow needles only while said needles are piercing, depositing said hardenable liquid into said holes and into contact with the sheets for binding the sheets together when the liquid hardens, and withdrawing said needles from said holes.

4,715,759

COUNTERFOIL BINDING

Hubert Larque, Route de Lys, Bruges 64800 Nay, France

Filed Dec. 17, 1984, Ser. No. 682,752
Claims priority, application France, Dec. 23, 1983, 83 20800
Int. Cl.[4] B42F 1/00; B42D 1/10, 5/00
U.S. Cl. 412—33 5 Claims



1. A counterfoil binding for classifying documents in loose-leaf form, comprising:

a plurality of thin superimposed strips bound together at a lateral edge in pad-like form and covered on at least one entire side with an adhesive layer;

a removable film covering the entire adhesive layer, said film having at least one line of least resistance for facilitating partial removal of the film from the surface of said strip, said film having a thickness which is at least as great as the thickness of the documents to be classified and said at least one line of least resistance being parallel to the bound edge of said strip; and

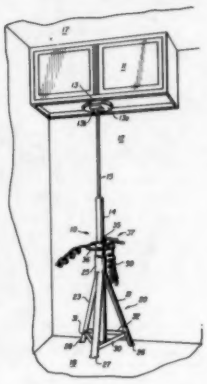
wherein each strip and associated film is configured so that removal of a portion of the film along said line of least resistance permits substitution of a loose-leaf sheet for the removed portion of film thereby forming a prolongation of the non-removed portion of the film and the non-removed portion maintains appropriate spacing between said plurality of strips.

4,715,760

HOIST FOR INSTALLING CABINETS, CEILING FRAMES AND THE LIKE

Ervin R. Browning, P.O. Box 430, Carlsbad, Calif. 92008

Filed Oct. 22, 1986, Ser. No. 921,306
Int. Cl.[4] E04G 1/00, 21/14
U.S. Cl. 414—10 13 Claims



1. A lifting device for hoisting wall mounted cabinets, ceiling frames and the like, the lifting device comprising:

a tripod support having three legs each having an upper end and a lower end, feet positioned at the lower ends of each of the legs to provide three spaced supports for the device and annular means for connecting the legs to one another adjacent the upper ends thereof;

a single tube fixed in the annular means and extending a substantial distance down between the legs of the tripod support;

a fluid cylinder telescopically received within the single tube;

a plurality of stations defined in the single tube for receiving stop means to longitudinally position the fluid cylinder in the single tube at a selected one of the stations;

means connected to the fluid cylinder for pressurizing the cylinder;

piston means within the fluid cylinder for extending longitudinally upon pressurizing the fluid cylinder;

extension means extending from the piston means for longitudinal movement therewith, the extension means having a distal end; and

a supporting platform mounted on the distal end of said extension means for supporting the object to be lifted.

4,715,761

UNIVERSAL FLOOR MOUNTED PIPE HANDLING MACHINE

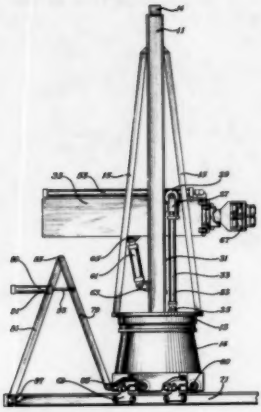
Joe R. Berry, Round Rock; Faustyn C. Langowski, Georgetown; James G. Renfro, Austin, and Roger Smith, Jr., Georgetown, all of Tex., assignors to Hughes Tool Company, Houston, Tex.

Continuation of Ser. No. 760,388, Jul. 30, 1985, abandoned. This application Mar. 3, 1987, Ser. No. 21,618
Int. Cl.[4] E21B 19/14
U.S. Cl. 414—22 3 Claims

1. A pipe handling machine, comprising:

a first set of tracks extending across a rig floor, toward and away from the well center, the rig floor having an upper surface which defines a horizontal plane, the tracks being

flush with the upper surface of the rig floor so that the tracks do not protrude past the horizontal plane;
a second set of tracks extending across the rig floor, transverse to the first set, the second set of tracks also being flush with the upper surface of the rig floor;
a trolley, engaging one set of tracks;
a turntable for transferring the trolley from one set of tracks to the other set of tracks;
means for moving the trolley along the tracks;
a base, mounted on the trolley;



means for rotating the base about a vertical axis; two parallel vertical tracks, extending upward from the base for movement with the base;
a carriage, mounted on the vertical tracks, for vertical movement along the tracks;
means for moving the carriage along the vertical tracks;
a multisection telescoping boom, connected to the carriage for movement therewith;
means for telescopically extending and retracting the boom;
means for luffing the boom about a horizontal axis; and a pipe-engaging head, mounted on the boom.

4,715,762

GRAPPLER SYSTEM FOR LIFTING APPARATUS

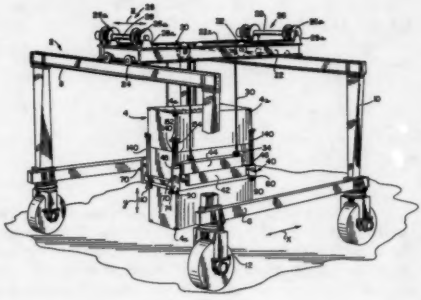
John J. Lanigan, Sr., Tinley Park; Myron Glickman, Morton Grove; Thazhuthekudiyil V. George, Chicago, and Bernard A. Ermel, Clarendon Hills, all of Ill., assignors to Mi-Jack Products, Inc., Hazel Crest, Ill.

Continuation of Ser. No. 761,620, Aug. 1, 1985, abandoned, which is a division of Ser. No. 683,970, Dec. 12, 1984, Pat. No. 4,546,891, which is a continuation of Ser. No. 583,119, Feb. 24, 1983, abandoned, which is a continuation of Ser. No. 346,513, Feb. 8, 1982, abandoned. This application Jan. 9, 1987, Ser. No. 4,807

Int. Cl.[4] B66C *17/20*; B65G *59/06*

U.S. Cl. 414—126 **11 Claims**

1. An apparatus for lifting containers of the type having lifting apertures at the corners thereof, which comprises:
an interconnected open center frame;
an open center bridge supported by said frame;
lift means carried by said open center bridge;
single grappler means connected to said lift means for engaging one or more of a plurality of stacked containers;
means operatively connecting said lift means to said grappler means to position said grappler means adjacent a stack of containers for lifting one or more of the containers;
said open center bridge being disposed above said grappler means with the open center permitting containers to be elevated to a vertical position above the bridge;
said grappler means including first latching means mounted for engaging apertures of a first container and second latching means mounted for engaging apertures of a second container carried on the first container;



said grappler means further including means for permitting withdrawal of said first latching means from said first container while permitting said second latching means to remain in engagement with the second container.

4,715,763

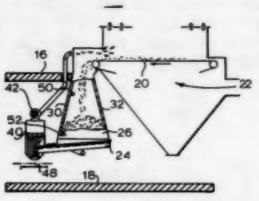
DRY ASH REMOVAL SYSTEM

Russell J. Galgana, Clarksville; Patrick F. Mahoney, Rensselaer, both of N.Y., and Gordon L. Sutin, Dundas, Canada, assignors to Smith & Mahoney, P.C., Albany, N.Y.

Filed Jul. 25, 1986, Ser. No. 890,762

Int. Cl.[4] B65D *88/28*; B65G *65/42*; F23J *3/00*

U.S. Cl. 414—216 **8 Claims**



1. An apparatus for removal of ash from the furnace of a solid fuel fired heat generator unit having a relatively elongated furnace front including
means for collecting ash from beneath the furnace and advancing it to the furnace front,
a conveyor located remote from the furnace front a distance therebelow, and
a hopper connecting the furnace front with the conveyor to communicate ash from the furnace front to the conveyor, the conveyor being operable to convey ash forwardly relatively of the hopper, the hopper being characterized by
a front elevational profile thereof of converging course from a widest lateral expanse thereof at entry thereto at the furnace front to a narrowest lateral expanse at outlet therefrom at said conveyor, and a side elevational profile of diverging course from a narrowest transverse expanse at the entry thereto to a maximum transverse expanse at the outlet thereof, the respective front and side elevational

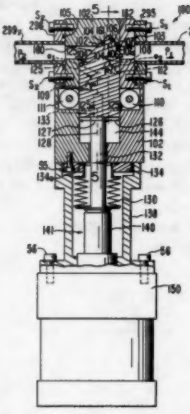
profiles following courses such that the cross-sectional area of said hopper from top to bottom is of substantially uniform measure.

4,715,764

GATE VALVE FOR WAFER PROCESSING SYSTEM

Martin A. Hutchinson, Santa Clara, Calif., assignor to Varian Associates, Inc., Palo Alto, Calif.

Filed Apr. 28, 1986, Ser. No. 856,876
Int. Cl.[4] B65G 51/02
U.S. Cl. 414—217 **11 Claims**



1. A valve comprising:

a valve body having a passage therethrough;

a valve gate having a first position in which said passage is open and a second position in which a first portion and a second portion of the surface of said valve gate each extend across said passage thereby dividing said passage into a first region and a second region;

sealing means, between said valve body and said first portion of said surface of said valve gate when said valve gate is in said second position, for providing a vacuum seal between said first region and said second region, a rotational moment being generated on said valve body by said sealing means being pressed between said first portion of said surface and said valve body when said valve gate is in said second position;

means between said second portion of said surface and said valve body when said valve gate is in said second position, for providing a rotational moment opposed to said rotational moment generated on said valve gate by said sealing means being pressed between said first portion of said surface and said valve body when said valve gate is in said second position, said means for providing a rotational moment not providing a vacuum seal between said first region and said second region; and

means connected to said valve gate for translating said valve gate from said first position to said second position and from said second position to said first position.

4,715,765

GRAVITY FLOW STORAGE SYSTEM

Charles Agnoff, 8 Split Rock Ct., Melville, N.Y. 11747

Filed Apr. 10, 1986, Ser. No. 850,227
Int. Cl.[4] A47F 5/00
U.S. Cl. 414—276 **8 Claims**

1. A gravity flow storage system for storing pallets comprising:

at least two parallel and laterally spaced-apart conveyors having a plurality of rotatably mounted, parallel longitudinally spaced-apart rollers, said conveyors being disposed at an inclined angle to define a storage lane having a front lower end and a rear upper end; and

at least two independent pallet carrier sets, each of said sets disposed respectively on an associated conveyor, said sets comprising at least two nested telescoping pallet carriers including an innermost and an outermost pallet carrier, with said nested pallet carriers normally resting upon said conveyor rollers and being longitudinally displaceable on said associated conveyor via said rollers thereof, wherein

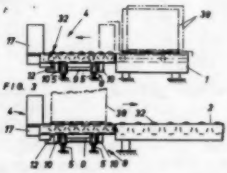
corresponding pallet carriers of said carrier sets cooperate to support a pallet thereon such that said system is loadable by successively placing pallets onto corresponding carriers at said front lower end and moving the pallets on said corresponding carriers rolling on said rollers towards said rear upper end, beginning with said outermost carriers, and said system being conversely unloadable by successively removing palllets at said front lower end, thereby allowing any previously loaded pallets to move under the force of gravity towards said front lower end.

4,715,766

COMBINED DISTRIBUTION APPARATUS FOR PIECE GOODS

Guenter Gebhardt, Sinsheim, Fed. Rep. of Germany, assignor to Gebhardt Fordertechnik GmbH, Sinsheim, Fed. Rep. of Germany

Continuation of Ser. No. 562,740, Dec. 19, 1983, abandoned.
This application Apr. 30, 1986, Ser. No. 858,845
Claims priority, application Fed. Rep. of Germany, Dec. 20, 1982, 3247126
Int. Cl.[4] B65G 67/00
U.S. Cl. 414—392 **6 Claims**



1. A distribution apparatus for piece goods, comprising a transporting system for picking up and delivering a piece good, the transporting system including plural conveyor means and plural loading fork means, said plural loading fork means being disposed in a manner such that they can be raised and lowered relative to the plural conveyer means and being operable in the transporting direction, drive motor means for selectively driving both the plural conveyor means and the plural loading fork means in the transporting direction for loading and unloading, and means for supporting said plural conveyor means and said plural loading fork means on a displaceable frame means operably shiftable transversely of the transporting direction, the plural loading fork means being supported on a displaceable chassis means operable to travel in the transporting direction, said displaceable chassis means including plural lever means each having one end thereof pivotally attached to the plural fork means near the ends thereof, roller means at another end of the plural lever means and supported in U-shaped bearer profile means on the displaceable frame means, plural actuating means extending below the plural fork means, each lever means on a fork means being pivotally attached to one of the plural actuating means, the plural conveyor means being sup-

ported in part by one side of the U-shaped bearer profile means, said drive motor means including drive means for each of the plural conveyor means and connected to the plural conveyor means and to the drive motor means, the drive motor means having a motor means fixedly mounted on the displaceable frame means and also drivingly connected to the plural actuating means to laterally shift the plural actuating means in the transporting direction to thereby pivot the plural lever means to cause the plural loading fork means to be raised in height above the plural conveyor means, said drive motor means also connected to plural fork shifting means mounted to an underside of the plural fork means to provide for shifting of the shiftable carriage means attached to the plural fork means in the transporting direction, and said fixedly mounted motor means being located at an edge of the displaceable frame means at a point away from the transporting direction.

4,715,767

MOTOR-DRIVEN GARBAGE TRUCK COMPRISING A DETACHABLE CONTAINER

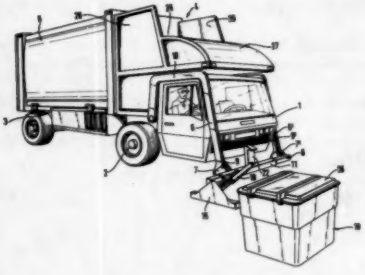
Gustav D. Edelhoff, Iserlohn, Fed. Rep. of Germany, and Fred I. Smith, Palos Verdes Pen, Calif., assignors to Edelhoff Polytechnik GmbH & Co., Iserlohn, Fed. Rep. of Germany

Filed May 14, 1985, Ser. No. 733,865

Claims priority, application Fed. Rep. of Germany, May 29, 1984, 3420058

Int. Cl.⁴ B65F *3/04*

U.S. Cl. 414—408 **12 Claims**



1. A motor-driven garbage truck having a chassis frame including front and rear axles and a driver's cab including a front windscreen mounted on said chassis frame and comprising a garbage container provided with a receiving opening and a closure member therefor and separable coupling elements, a pouring unit permanently mounted on said truck in a forward portion thereo and a pouring hute leading to a receiving space, lifting and tipping apparatus for picking up a garbage can and discharging the contents thereof into said chute, and a conveying and compacting apparatus for transferring garbage from said receiving space into said container through said receiving opening, said pouring unit being disposed in part above said driver's cab and in part between said driver's cab and said container, said chute being disposed in a region extending behind and above said driver's cab, said lifting and tipping apparatus comprising at least one lifting arm pivotally movable about a transverse pivot carried by said pouring unit or said chassis frame, said lifting arm carrying at its free end a carrying rail disposed parallel to said transverse pivot and which is pivotally movable between a pick-up position, in which said rail is disposed below and in front of said driver's cab, and a pouring position, in which said rail is disposed above and behind said driver's cab, said rail being provided with displaceable or pivotally movable extensible means for coupling to and gripping a garbage can, said displaceable or pivotally movable extensible means for coupling and gripping a garbage can including a link in the form of an arm, said link being eccentrically mounted on a profiled member slidably mounted on said carrying rail and extensible beyond at least one end of said carrying rail for pivotal movement about a vertical axis, the link at its free end carrying a triangular shaped self-centering claw member having beveled edges which cooperate with a similar shaped member on said garbage can for picking up said garbage can and means for pivotally moving said claw member between an outer position, in which said carrying rail or said profiled member picks up said garbage can and an inner position in which said lifting and tipping apparatus transports said garbage can to said pouring opening.

12. A tipping device for motor-driven garbage-collecting trucks comprising a holding claw adapted to cooperate with edge portions of garbage cans provided with open ends and upper sides and with a receiving pocket on the open ends thereof, and a gripping arm, said tipping device characterized by the fact that said holding claw is a plate having the shape of an isosceles triangle having an upwardly directed vertex and the upper sides of which form inwardly tapering, beveled gripping edges which cooperate with said receiving pocket on said garbage cans, said receiving pocket having a complementary undercut surface and being formed by a section member located on and reinforcing the edge portion of said garbage cans at an open end, said holding claw being attached to a free end of said gripping arm.

4,715,768

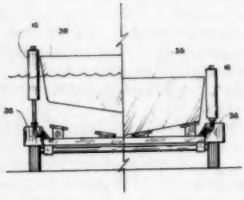
BOAT TRAILER GUIDE

Lloyd O. Capps, Rte. 5, Box 445, Claremore, Okla. 74017

Filed Jul. 21, 1986, Ser. No. 887,745

Int. Cl.⁴ B60P *3/10*

U.S. Cl. 414—535 **3 Claims**



1. A boat trailer guide comprising:

(a) a bracket means for attaching to a boat trailer and adapted to hold a shaft means substantially vertical and adjacent to the side of a boat support on a trailer;

(b) a shaft means for supporting a floatable roller wherein said shaft means is attachable to said bracket means and adapted to be held substantially vertical and adjacent to the side of a boat supported on a trailer when said bracket means is attached to a boat trailer; and

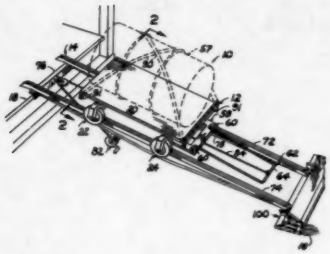
(c) a floatable roller attached to said shaft means and adapted to rotate about said shaft means as well as to float upwardly and extend telescopically on said shaft means, thus extending the boat guide vertically, when a boat trailer to which said bracket means is attached such as to hold said shaft means substantially vertical is lowered below water.

4,715,769

RAIL SUPPORTED ARTICULATED CLIMBING DOLLY

Robert E. Kirtley, 30 N.E. 65, Oklahoma City, Okla. 73105

Filed Apr. 17, 1986, Ser. No. 853,110
Int. Cl.[4] B65G *11/02*
U.S. Cl. 414—571 2 Claims



1. A climbing dolly system, comprising:
a normally horizontal platform having forward and rearward ends;
frame means including an axle underlying and depending upon respective end portions of said platforms;
at least one of said frame means being pivotally connectd with the platform for horiozntal pivoting movement about a vertical axis;
each said frame means including at least one transverse frame member having at least one wheel strut depending from its respective ends;
tongue and handle means connected with said one frame means for manual steering movement of said dolly on a horizontal surface;
wheels journalled by said axles for supporting respective end portions of said platform in a mobile manner when on a horizontal surface;
track means including a pair of box channel tracks disposed in spaced parallel relation extending in a fixed position between vertically spaced horizontal support surfaces for supporting the dolly during movement from one elevation to another;
roller means moveable on said track means including two pairs of rollers connected with the depending end portion of each said wheel strut in forward to rearward aligned spaced relation adjacent the respective wheel and spaced upwardly with respect to a horizontal surface supporting the wheels,
the rollers of each pair of said pair of rollers being juxtaposed transversely of the dolly platform;
a pulley block secured to one end portion of the track means; and,
which means mounted on the track means and having a flexible element entrained through the pulley block for moving the dolly along the track means.

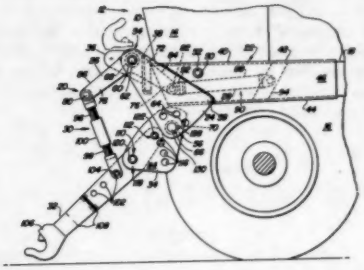
4,715,770

POWER LIFT FOR A LIFTING DEVICE

Robert Kryscyk, Ketsch, Fed. Rep. of Germany, assignor to Deere & Company, Moline, Ill.

Continuation of Ser. No. 786,924, Oct. 11, 1985, abandoned.
This application Feb. 5, 1987, Ser. No. 13,214
Claims priority, application Fed. Rep. of Germany, Oct. 25, 1984, 3439048
Int. Cl.[4] B66C *1/00*
U.S. Cl. 414—680 6 Claims

1. A front-mounted power lift assembly for an agricultural tractor comprising a frame member fixed to the tractor, at least one vertically movable lower link having means for engaging an implement, and at least one arm, one end of the arm being coupled to the lower link, characterized by means for pivotally coupling the link to the one end of the arm at a pivot axis and by means for selectively rotatably and non-rotatably connecting the other end of the arm to the frame member, the means for connecting the arm to the frame member comprising at least one opening in the arm, a plurality of openings in the



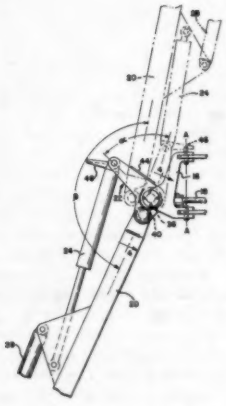
frame member and a pin for insertion through the at least one opening in the arm and through a selected one of the frame member openings, the power lift assembly further comprising a lifting means for vertical moving of the lower link.

4,715,771

VARIABLE GEOMETRY MOUNTING ARRANGEMENT FOR BACKHOE ASSEMBLY

Charles B. Hanson, Burlington, Iowa, assignor to J. I. Case Company, Racine, Wis.

Filed Nov. 10, 1986, Ser. No. 928,873
Int. Cl.[4] B66C *23/42*
U.S. Cl. 414—688 4 Claims



1. An arrangement for mounting a hydraulically positionable backhoe having a boom on a material-handling implement, comprising:
swing tower means mounted on the material handling implement for supporting the backhoe;
pivotal coupler means pivotally joined to the swing tower means for relative pivotal movement about a first horizontal axis;
means pivotally coupling the boom of the backhoe to the coupler means for relative pivotal movement about a second horizontal axis spaced from the first horizontal axis;
first gear means joined to the swing tower means and fixed against rotation with respect thereto;
second gear means joined to the boom of the backhoe and fixed against rotation with respect thereto, said second

gear means being in operative meshing engagement with the first gear means; and

selectively extensible hydraulic fluid actuator means extending between said coupler means and the boom of said backhoe, whereby extension of the actuator means causes the second gear means to move about the first gear means to thereby alter the vertical disposition of the second horizontal axis relative to the first horizontal axis, and to thereby pivot the coupler means about the first horizontal axis while the boom of said backhoe pivots about the second horizontal axis.

4,715,772

APPARATUS FOR AUTOMATIC GLAZING OF CARS

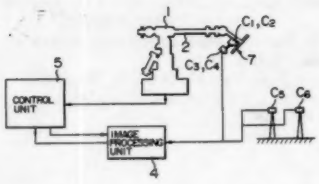
Hideaki Kanayama, Toyama, Japan, assignor to Kabushiki Kaisha Fujikoshi, Toyama and Mazda Motor Corporation, Hiroshima, both of, Japan

Filed Apr. 21, 1986, Ser. No. 853,912

Claims priority, application Japan, May 30, 1985, 60-115375

Int. Cl.[4] B25J *11/00*

U.S. Cl. 414—730 **1 Claim**



1. An apparatus for automatic glazing of cars comprising:

a robot having a robot arm;

a gripping tool mounted on said robot arm for gripping a window glass;

a first set of two T.V. cameras fixed along a conveyor line for respectively taking images of front and rear pillars of a body shell stopped at a predetermined position;

a second set of T.V. cameras mounted on said gripping tool for taking images of a window frame for position compensation of said window glass, said second set of T.V. cameras mounted on said gripping tool comprising two cameras mounted on the lower side of said gripping tool and two cameras mounted on transverse sides of said gripping tool, said lower side cameras respectively taking images of reference members mounted on the lower portion of said window frame for supporting the lower end of said window glass and said transverse side cameras respectively taking images of transverse ends of said window glass and frame;

an image processing unit for distinguishing between different kinds of body shells and for calculating position variations of the stopped body shell with respect to predetermined positions thereof from images of said first set of two T.V. cameras fixed along the conveyor line and said second set of T.V. cameras mounted on said gripping tool; and

a control unit for receiving a signal representing a distinguished kind of body shell from said image processing unit to move said robot arm to select a window glass of said distinguished kind of body shell and for receiving signals corresponding to the position variations from said image processing unit to move the robot arm so as to compensate for said position variations.

4,715,773

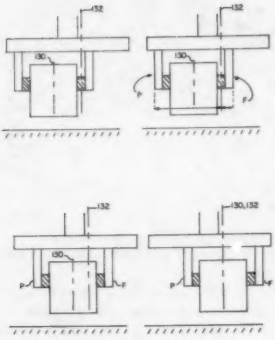
METHOD AND APPARATUS FOR REPOSITIONING A MISLOCATED OBJECT WITH A ROBOT HAND

Joey K. Parker, Tuscaloosa, Ala., and Frank W. Paul, Seneca, S.C., assignors to Clemson University, Clemson, S.C.

Continuation-in-part of Ser. No. 741,277, Jun. 4, 1985. This application Jun. 9, 1986, Ser. No. 872,219

Int. Cl.[4] B25J *9/16*

U.S. Cl. 414—730 **10 Claims**



1. A method for translating an object held by at least two fingers of a robot hand at a predetermined gripping force to a predetermined position relative to a fixed point of the robot hand, the method comprising:

sensing the position of each finger relative to the fixed point of the robot hand;

for each finger, determining whether said finger is at the greater distance from the predetermined position;

selecting the finger at the greater distance as the finger to be position-controlled and selecting the other finger as the finger to be force-controlled;

moving said position-controlled finger toward the predetermined position;

controlling movement of said position-controlled finger according to the position of said position-controlled finger relative to the fixed point of the robot hand;

sensing the gripping force between said force-controlled finger and the object;

controlling movement of said force-controlled finger according to said gripping force sensed between said force-controlled finger and the object;

stopping movement of said position-controlled finger when the object reaches the predetermined position relative to the fixed point of the robot hand; and

when said position-controlled finger is stopped and the predetermined gripping force is applied to the object, then stopping said force-controlled finger.

5. An apparatus for translating an object held by at least two fingers of a robot hand, to a predetermined position relative to a fixed point of the robot hand, the apparatus comprising:

means for sensing the position of each finger relative to the fixed point of the robot hand;

finger differentiation means for identifying the finger at the greater distance from the predetermined position as the position-controlled finger and for identifying the other finger as the force-controlled finger;

means for moving each finger;

means for controlling movement of said position-controlled finger according to the position of said position-controlled finger relative to the fixed point of the robot hand;

means for sensing the force between said force-controlled finger and the object; and

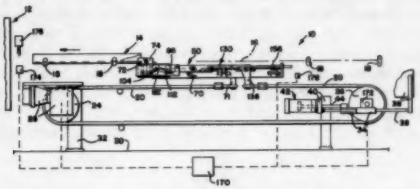
means for controlling movement of said force-controlled finger according to the force sensed between the force-controlled finger and the object.

4,715,774

WORKPIECE ADVANCING APPARATUS

James M. Magnuson, Kankakee, Ill., assignor to Peddinghaus Corporation, Bradley, Ill.

Filed Dec. 23, 1985, Ser. No. 812,739
Int. Cl.[4] B65G *25/00*
U.S. Cl. 414—751 17 Claims



1. Apparatus for gripping and advancing a workpiece for processing, said apparatus including:

(a) a flexible tension member;

(b) guide means for supporting said tension member, said tension member being trained about said guide means for movement on said guide means in a workpiece advancing direction and in a direction opposite thereto;

(c) gripping means including a pair of cooperating jaw means for gripping said workpiece, said jaw means of said gripping means being operatively connected to said tension member for operation of said jaw means between an open position wherein said jaw means are spaced apart, and a closed position by relative movement of said jaw means toward each other, said flexible tension member including two ends, with one of said ends operatively connected with one of said jaw means, and with the other of said ends operatively connected with the other of said jaw means;

(d) tensioning means for selectively tensioning and untensioning said tension member for operating said jaw menas of said gripping means from between one of said open and closed positions and the other of said positions; and

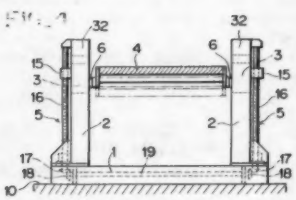
(e) drive means for selectively moving said tension member on said guide means to move said pair of cooperating jaw means of said gripping means selectively in said advancing and opposite directions.

4,715,775

180 DEGREE INVERTING MACHINE

Hiroyuki Amino, Shizuoka, Japan, assignor to Amino Iron Works Co., Ltd., Shizuoka, Japan

Filed Apr. 26, 1985, Ser. No. 727,902
Claims priority, application Japan, Oct. 17, 1984, 155810[U]
Int. Cl.[4] B25B *11/00*
U.S. Cl. 414—758 22 Claims



15. An inverting machine for inverting metal molds 180° for finishing, assembling, dismantling, checking, repairing, and cleaning thereof, the inverting machine comprising:

a base;

a stationary table positioned on said base and having two lateral sides;

a pair of portal uprights mounted on said table and extending upwardly from each of said sides;

two slide frames each slidably movable along said uprights;

means for vertically moving said slide frames relatively to a respective pair of said uprights;

an inverting table having a T-groove for holding a metal mold to be inverted and extending between said slide frames, said inverting table being arranged in opposition to said stationary table and having two opposite sides each with a width;

a central shaft having ends and being pivotally supported by said slide frames at said ends and extending from a center of said width of each side of said inverting table, said central shaft having an outer circumference;

clutch means located between said central shaft and said inverting table for selectively making and breaking connection between said central shaft and said inverting table;

first gears provided on said outer circumference of said central shaft;

second gears provided on said slide frames and being formed and arranged to mesh with said first gears; and

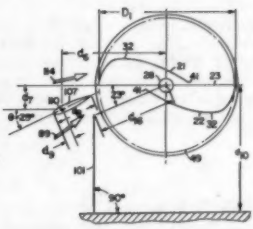
means for driving said second gears including a reversible power source, said stationary table being arranged so as to provide for a path for transporting the metal mold in front of at least said stationary table.

4,715,776

WIND TURBINE SYSTEM USING A SAVONIUS TYPE ROTOR

Alvin H. Benesh, 120 S. Adams Ave., Pierre, S. Dak. 57501

Filed Nov. 22, 1985, Ser. No. 801,069
Int. Cl.[4] F03D *3/04*
U.S. Cl. 415—2 R 21 Claims



1. A Savonius rotor assembly for interacting with a moving fluid, comprising:

(a) a support framework;

(b) a rotor mounted on the support framework for rotation about a central horizontally extending axis, the rotor having two blades disposed symetrically about the central horizontally extending axis, each of the blades having an outer edge and an inner edge with respect to the central, horizontally extending axis, the outer edges of the blades lying on a circle defining a diameter of the rotor, the blades further having a first curved portion and a second curved portion, the first curved portion beginning at the outer edge and terminiating at the second curved portion with the first curved portion defining a surface generally concave with respect to the central, horizontally extending axis, the first curved portion having a radius of curvature which becomes progressively less from the outer edge to the second curved portion, the second curved portion coming progressively closer to a plane containing the central, horizontally extending axis and the outer edge of the blade as the second curved portion extends from the first curved portion to the inner edge of the blade, the maximum displacement of the blades from the plane being less than one-quarter of the diameter of the rotor; and

(c) a deflector member extending along the length of the rotor and beyond the ends of the rotor and positioned on

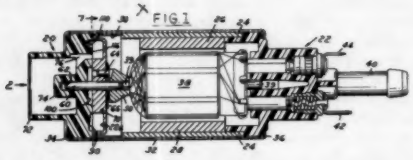
a side of the rotor facing the direction from which the fluid is flowing, a top edge of the deflector member being positioned below a substantially horizontal plane extending through the central, horizontally extending axis of the rotor.

4,715,777

LATERAL CHANNEL SUPPLY PUMP

Charles H. Tuckey, Cass City, Mich., assignor to Walbro Corporation, Cass City, Mich.

Filed Sep. 18, 1985, Ser. No. 777,332
Int. Cl.[4] F04D *5/00*
U.S. Cl. 415—53 T **8 Claims**



1. In a lateral channel pump having an inlet housing with a pumping face in a first plane normal to the axis of rotation and a rotor having a multi-pocketed pumping face to rotate adjacent said housing pumping face, that improvement which comprises:

(a) means forming an arcuate intake passage in said pumping face having a leading and a trailing end extending essentially concentric to the axis of rotation and circumferentially a first predetermined angle of the 360° rotation,

(b) a radially extending outlet port in said pumping face spaced circumferentially away from said intake passage a second predetermined angle, and

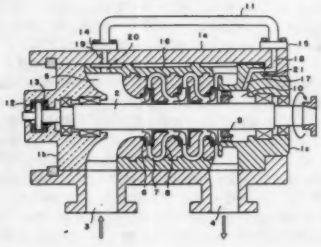
(c) a circumferential sweep channel in said pumping face between the trailing end of said arcuate intake passage and said outlet port having a cross-section enlarging radially from the inner circumference of said channel to the outer circumference of said channel said sweep channel further enlarging in cross-sectional area from said inlet to said outlet.

4,715,778

CENTRIFUGAL COMPRESSOR

Kazuso Katayama; Taku Ichiryu; Tsuneyoshi Mitsuhashi; Yasushi Mori, and Masanori Kobayashi, all of Takasago, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 30, 1986, Ser. No. 857,490
Claims priority, application Japan, Apr. 1, 1986, 61-47097[U]
Int. Cl.[4] F01D *3/04*
U.S. Cl. 415—104 **9 Claims**



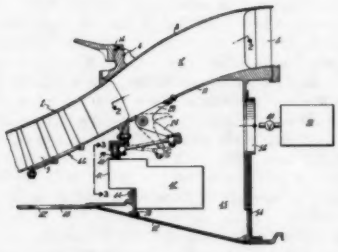
1. A centrifugal compressor of the type in which disassembly and assembly of said compressor is effected by taking out and inserting internal component parts including end walls for closing ends of a cylindrical rotor chamber in the axial direction thereof; characterized in that an intake chamber side communication hole communicating with an intake chamber formed within said cylindrical rotor chamber and a propelling force balance chamber side communication hole communication with a propelling force balance chamber formed within said cylindrical rotor chamber, are provided in said internal component parts and in said cylindrical rotor chamber wall, and the intake chamber side communication hole and the propelling force balance chamber side communication hole provided in said cylindrical rotor chamber wall are communicated with each other through a balance pipe mounted on an outer surface of said cylindrical rotor chamber wall, the propelling force balance chamber side communication hole in the cylindrical rotor chamber wall being formed in an inner axial end surface of the cylindrical rotor chamber wall, the inner axial end surface extending perpendicularly to the axial direction.

4,715,779

BLEED VALVE FOR AXIAL FLOW COMPRESSOR

Gabriel L. Suciu, Glastonbury, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Dec. 13, 1984, Ser. No. 681,331
Int. Cl.[4] F01B *25/00*
U.S. Cl. 415—144 **7 Claims**



1. A bleed valve construction for a multistage compressor including:

a support case having spaced inner and outer walls defining an air duct for the compressor between them and struts extending between the walls across the air duct, said struts and the case being located between adjacent stages of the compressor,

bleed doors mounted in openings in the outer wall of the case between adjacent struts and being movable into open or closed position, each door having a projecting arm thereon,

an actuating ring mounted on said outer case in spaced relation to said door and means contraining said ring to move circumferentially without axial movement,

a plurality of links connecting the ring to the doors, one link for each door for moving the doors in unison into open or closed position in response to circumferential movement of said ring, and

actuating means for causing circumferential movement of the ring for actuation the doors in unison.

4,715,780

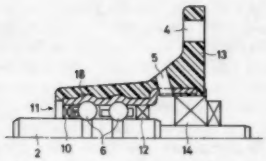
WATER PUMP

Yoshiro Kan, Fujisawa, Japan, assignor to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 30, 1985, Ser. No. 771,119
Claims priority, application Japan, Sep. 10, 1984, 59-136138[U]
Int. Cl.[4] F04D *29/08*
U.S. Cl. 415—170 A **14 Claims**

1. A water pump for an engine of an automotive vehicle, comprising: a rotary pump shaft to which are fixed a drive pulley and a liquid circulating impeller for circulating engine

cooling fluid on rotation of said pump shaft through said drive pulley, bearing means rotatably supporting said pump shaft and including an inner race, an outer race, and a plurality of rolling members rollingly disposed between said inner and outer races, and a separate pump housing formed of resin and molded to said outer race of said bearing means so as to be integrally



attached to said outer race, whereby said pump shaft is rotatably supported within said pump housing, said outer race having a reinforcing member connected thereto which extends into and reinforces said pump housing, said pump housing having a mounting portion including means for mounting the housing to an engine with the impeller disposed to circulate cooling fluid within the engine.

4,715,781

COVER FOR TURBINES AND PUMPS

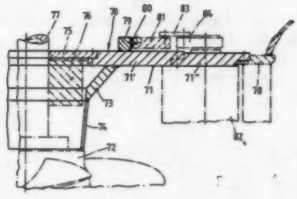
Helmut Bronowski, and Christian Dahlke, both of Heidenheim, Fed. Rep. of Germany, assignors to J. M. Voith GmbH, Fed. Rep. of Germany

Division of Ser. No. 820,691, Jan. 16, 1986. This application Sep. 18, 1986, Ser. No. 908,796

Claims priority, application Fed. Rep. of Germany, Jan. 22, 1985, 3501883

Int. Cl.[4] F01D *25/24*

U.S. Cl. 415—219 C **9 Claims**



1. In a machine of the type of a propeller-type turbine, Kaplan-type turbine, or similarly-shaped pump, or the like, the machine comprising

a rotatable shaft; a rotatable runner on the shaft, such that rotation of the shaft and the runner applies an axial force on the shaft; bearings on the shaft for supporting the shaft for rotation; and an outer covering around the shaft and the runner;

the improvement comprising a cover for said machine, the cover consists essentially of

(a) a flat ring which is supported at an exterior edge thereof on the outer covering;

(b) a first shell which is conically shaped, and is welded to the side of the flat ring toward the runner; the first shell concentrically surrounding the shaft and tapering narrower toward the runner; and

(c) on the side of the conical first shell toward the runner, a second shell also conically shaped for directing radially inward water flow axially toward said runner and defining a lesser conical angle than the first conical shell, and extending from an exterior region of the first conical shell and toward the runner;

the flat ring, the first shell, and the second shell comprising sheet metal material and having welded joints therebetween; and

at least one said bearing being mounted between the flat ring and the shaft.

4,715,782

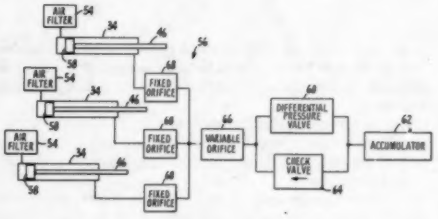
HYDRAULIC CONTROL DEVICE FOR WIND TURBINE

David M. Shimmel, Tracy, Calif., assignor to Fayette Manufacturing Corp., Tracy, Calif.

Filed Dec. 24, 1985, Ser. No. 812,975

Int. Cl.[4] F03D *7/04*

U.S. Cl. 416—32 **7 Claims**



1. A wind turbine apparatus comprising:

a wind turbine rotor having one or more blades;

one or more rotor braking devices each coupled to one of said blades, wherein each rotor braking device is movable between an aligned position for normal operation of said rotor and a braking position for slowing said rotor, and wherein the centrifugal force acting on said rotor braking devices during rotation of said rotor tends to move said rotor braking devices from said aligned positions to said braking positions;

one or more fluid cylinders each mechanically coupled to a blade and its associated rotor braking device, wherein the fludic pressure within said fluid cylinders opposes the movement of the said rotor braking devices from said aligned positions to said braking positions;

a variable orifice connected to said fluid cylinders for regulating the flow of fluid from the fluid cylinders and the deployment time of the rotor braking devices;

pressure difference valve means fluidically coupled between said variable orifice and an accumulator for opening when the pressure within said fluid cylinders exceeds the pressure in the accumulator by a predetermined amount;

accumulator means for receiving pressur from said fluid cylinders by way of said variable orifice when said pressure difference valve means is open so that the stored fluid is at at pressure which is intermediate between the pressure in said fluid cylinders and the pressure in said accumulator at the time the relief valve opens; and

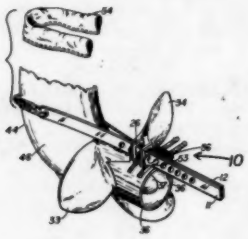
check valve means fluidically coupled in parallel with said pressure difference valve means between said accumulator means and said variable orifice for permitting pressurized fluid at said intermediate pressure to flow therethrough only in the direction from said accumulator means towards said fluid cylinders to return said braking devices to said aligned positions when the pressure in said accumulator means exceeds the pressure in said fluid cylinders, wherein said fluid cylinders pressure difference valve means, accumulator means, and check valve means form a pressurized, closed, fluidic system.

4,715,783

THEFT-PROOFING DEVICE FOR OUTBOARD MOTOR PROPELLERS

Mark W. Wade, 3667 Quentin Ave., Boynton Beach, Fla. 33436

Filed Dec. 12, 1986, Ser. No. 941,152
Int. Cl.[4] F16B *41/00*
U.S. Cl. 416—146 R **8 Claims**



1. A theft-proofing device for a propeller of an outboard motor of the type having a substantially upright drive shaft and a substantially horizontal propeller shaft and housings therefor comprising:

(A) a pair of elongated bar means,

(B) hinge means connecting together said pair of bar means,

(C) tubular blocking means for blocking linear movement of said propeller,

(D) forward projections of said blocking means, said projections fitting between and against said blades of said propeller,

(E) support means for said tubular means, said support means being slidably positionable on said pair of bar means, and

(F) means locking said support means in a fixed position relative to said pair of bar means

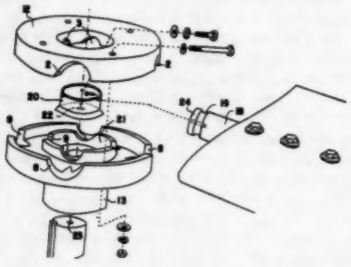
whereby, said hinge means being positioned against a forward portion of said upright shaft housing with said pair of bar means projecting aft on either side thereof between said blades and above said horizontal shaft housing, said propeller shall be protected from theft or rotation when said projections of said blocking means are inserted against said blades and said locking means is locked in position on said bar means.

4,715,784

BLADE SUPPORT HUB FOR AN AXIAL FAN

Antonio Mosiewicz, Milan, Italy, assignor to Cofimco S.p.A., Milan, Italy

Filed Feb. 14, 1984, Ser. No. 580,061
Claims priority, application Italy, Mar. 9, 1983, 19975 A/83
Int. Cl.[4] F04D *29/34*
U.S. Cl. 416—208 **7 Claims**



1. A blade support hub of hollow circular ring structure for an axial fan with at least two blades, comprising two facing opposite parts each having an inwardly facing inner rim and an inwardly facing outer rim corresponding respectively to the minor diameter and to the major diameter of said circular ring structure spaced-apart; radially extending blade shank housing seats formed by bored cavities in said circular ring structure which extend through both the outer rim and the inner rim; the diameter of the cavity bore through the inner rim being of smaller diameter than the diameter of the cavity bore through the outer rim, which has the same diameter as the blade shank, the blade shank having an annular groove in a position corresponding to said inner ring for radially locking the blade; bolts for holding the opposite parts together in facing relationship, the blades being positioned so as to be fixed in their cavities all simultaneously upon tightening of the two opposite parts together by means of said bolts.

3. A method for manufacturing a blade support hub of hollow circular ring structure having two facing opposite parts, each with an inwardly facing inner rim and an inwardly facing outer rim, comprising the steps of

casting the two opposite parts to a standard dimension;

securing the two opposite parts together in facing relationship; and

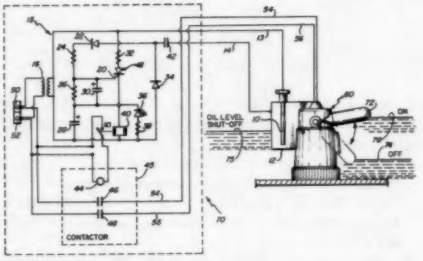
then machining spaced-apart radial extending blade shank opening into the assembled opposite parts in the number and dimensions required.

4,715,785

OIL DETECTION APPARATUS FOR SUBMERSIBLE PUMPS

Richard R. Gurega, Easton, Conn., assignor to Richal Corporation, Bridgeport, Conn.

Filed Mar. 14, 1986, Ser. No. 840,315
Int. Cl.[4] F04B *49/00*
U.S. Cl. 417—1 **2 Claims**



1. Apparatus for detecting the presence of oil in the vicinity of a water immersible pump having a conductive housing including an extending wall member and a drive motor, comprising:

a probe adapted to be immersed in a liquid mixture of oil and water, said probe being mounted on the pump housing; and

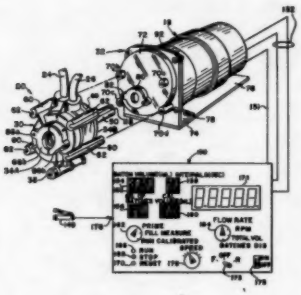
electrical circuit means connected between said probe and said wall member for operating the motor driving said pump in response to sensing water between said wall member and probe and for rendering said motor inoperable in response to sensing oil between said wall member and probe.

4,715,786

CONTROL METHOD AND APPARATUS FOR PERISTALTIC FLUID PUMP

Donald L. Wolff, Barrington; Porter T. McCauley, Northfield; Paul Stiefel, Skokie; Gyoergy J. Takacs, Wheeling, and Roman A. Adams, Lincolnshire, all of Ill., assignors to Cole-Parmer Instrument Company, Chicago, Ill.

Filed Dec. 14, 1984, Ser. No. 682,031
Int. Cl.[4] F04B *49/06*
U.S. Cl. 417—22 **20 Claims**



1. A control apparatus for a peristaltic pump having a housing with an internal chamber and a pair of openings communicating with the chamber, a length of tube extending through one opening and out the other and having a portion looped internally in the chamber so as to form a continuous flow passage through the tube, displacement means supported within the chamber and operatively associated with the tube to perform a peristaltic pumping action within the tube by deforming the tube, and a motor to rotate the displacement means and cause the deformation; said control apparatus comprising:

means for sensing the actual angular velocity of the motor and for generating a motor speed signal indicative of said actual velocity;

means for generating a desired velocity signal;

means for comparing said actual velocity signal and said desired velocity signal and for generating an error signal of one logic level if said actual velocity is greater than said desired velocity and for generating said error signal as another logic level if said desired velocity is greater than said actual velocity;

means for controlling the velocity of said motor in a direction tending to null the difference between said actually velocity and said desired velocity;

programmed microprocessor means for alternatively setting said desired velocity signal to zero or said desired value; said microprocessor means being responsive to a stored set of instructions and a plurality of switch inputs producing mode commands; and

said switch input including a run switch to turn the motor on, a stop switch to turn the motor off, and a mode switch to determine the operational function of the apparatus; wherein said operational functions include using the apparatus as an uncalibrated flowmeter, a calibrated flowmeter, or a calibrated dispenser.

4,715,787

COAXIAL, TWO-CYLINDERED AIR COMPRESSOR

Michael Hung, Taipei, Taiwan, assignor to Utility Electronics Industries Co. Ltd., Taipei, Taiwan

Filed Mar. 28, 1986, Ser. No. 845,854
Int. Cl.[4] F04B *39/00, 35/04*
U.S. Cl. 417—63 **1 Claim**

1. Two-cylindered air compressor sharing a common axial line, comprising:

an outer casing;

a main frame disposed inside the outer casing an penetrating, in association with, strutting supports;

a gas cylinder proper composed of two cylinder members sharing a common axis positioned on either side down the main frame with each cylinder member having an intake port and an outlet port;

a motor as the source of transmission of the cylinder members positioned up the main frame;

a transmission gear, fitted to the shaft core of the motor for the purpose of transmission engagements;

a reduction gear, fitted by articulation over the top of the main frame, for interactive engagement with the transmission gear;

a backside shaft bushing, positioned over the main frame and the reduction gear, serving to fit by articulation the shaft member of the reduction gear;

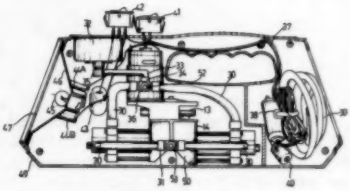
a front side shaft bushing, positioned inside the main frame and beneath the reduction gear, serving to fit by articulation the shaft member of the reduction gear;

a pressure gage, mounted over the shell casing, with which the reading of the output gas pressure is taken;

a two-pass joint bolted to the bottom side of the pressure gage;

a three-pass joint, established on the underside of the interior of the shell casing, of which one end is thread-coated and extending beyond the outside to serve as an air intake passage;

a four-pass joint, established over the interior of the shell casing of which one end is extended beyond the casing, duly thread-coated, to serve as a discharging path;



a small rubber tube, interconnecting the two-pass joint with the four-pass joint;

means to fasten the small rubber tube in position;

a plurality of rubber tubes, used to interconnect the two outlet ports of the cylinder members and the four-pass joint, and to interconnect the two intake ports of the cylinder members with the three-pass joint;

a plurality of tubing guides to fix the fitting of the rubber tubes;

a motor pushkey, as a control of the motor and fitted to the upper side of the shell casing;

a light-bulb, fitted ahead of the shell casing, and having a bulb circuit to provide electricity thereto;

a reflection board, fitted in front of the shell casing;

a flicker, in series connection with the bulb circuit inside the shell casing, serving as the command of the bulb, flashing or otherwise;

a case lid to close access at the rear side of the shell casing, said case lid being a transparent lid applied with a color coating, which, once fixed to the shell casing, will keep attachments and accessories tightly secured in the casing, and which, when attached to the frontal end of the shell casing, will achieve alerting, warning effects in conjunction with the flickering of the bulb;

the four-pass joint, by means of the rubber tube, bringing the outlet port of each cylinder member, in conflux into the joint, so that as the motor on top of the main frame drives the cylinder members to activation, one such cylinder member will perform suction of atmospheric pressure whilst the other will discharge at all the same time,

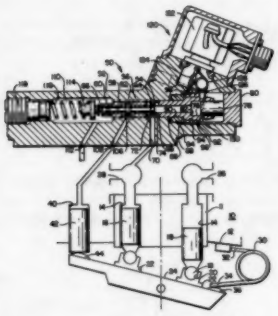
thereby achieving the operation of continuous inflation and air inhalations all at once.

4,715,788

SERVO CONTROL VARIABLE DISPLACEMENT PRESSURE COMPENSATED PUMP

Herbert H. Kouns, Camarillo, and Loren D. Gardner, Granada Hills, both of Calif., assignors to Abex Corporation, Boston, Mass.

Filed Dec. 16, 1982, Ser. No. 450,299
Int. Cl.[4] F04B 1/26
U.S. Cl. 417—218 3 Claims



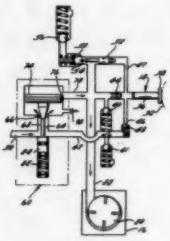
1. A variable displacement pump comprising: a fluid inlet and a fluid outlet; a displacement adjustment mechanism movable between a position of maximum fluid displacement and a position of minimum fluid displacement; means biasing the displacement adjustment mechanism towards the maximum fluid displacement position; a pressure compensator mechanism for maintaining the pressure of the fluid in the outlet at a constant set value, having a housing, a first bore in the housing, a sleeve received in the first bore, and movable between a first position which provides a maximum setting for the pressure compensator mechanism and a second position which provides a minimum setting for the pressure compensator mechanism, a longitudinal bore in the sleeve, a spool received in the longitudinal bore, a control land on the spool which cooperates with a control port in the sleeve and a spring which acts on the spool for providing a pressure setting for the pressure compensator mechanism; and conduit means for connecting the control port to the displacement adjustment mechanism wherein outlet pressure fluid is supplied to one side of the control land and a low pressure conduit is connected to the other side of the control land and the spool shifts to connect outlet pressure fluid to the control port and to the displacement adjustment mechanism to cause it to overcome the biasing means and reduce the displacement of the pump when the pressure of the fluid in the outlet exceeds the pressure setting of the pressure compensator mechanism and the spool shifts to connect the low pressure conduit to the control port and to the displacement adjustment mechanism to allow the biasing means to increase the displacement of the pump when the pressure of the fluid in the outlet falls below the pressure setting of the pressure compensator mechanism, characterized by control means for positioning the sleeve in the first bore intermediate the first and second positions to change the position of the control port with respect to the spring and spool to thereby set the pressure of the pressure compensator mechanism between its maximum and minimum settings.

4,715,789

HIGH SPEED HYDRAULIC FLUID VENTING VALVE IN A HYDRAULIC FLUID PUMP

Reinald D. Liegel, and James G. Ballard, both of Waukesha, Wis., assignors to Hein-Werner, Inc., Waukesha, Wis.

Filed Mar. 17, 1986, Ser. No. 839,977
Int. Cl.[4] F16D 31/00
U.S. Cl. 417—253 6 Claims



1. A valve assembly for controlling discharge of hydraulic fluid from a high pressure hydraulic fluid container to a hydraulic fluid reservoir, the valve assembly comprising:

a valve body including a valve bore, said valve bore including a valve seat,

a first inlet port communicating with said valve bore on one side of said valve seat, said first inlet port being adapted to be connected to a source of hydraulic fluid pressure,

a first hydraulic fluid outlet port communicating with said valve bore on an opposite side of said valve seat and being adapted to communicate with the hydraulic fluid reservoir,

a valve spool housed in said valve bore, said valve spool having opposite ends, one end of said valve spool including a valve member selectively engageable with said valve seat to prevent hydraulic fluid flow through said valve bore, said first inlet port entering said valve bore between said opposite ends of said valve spool,

means for selectively biasing said valve member against said valve seat when the hydraulic fluid pressure supplied to the first inlet port from the source of hydraulic fluid pressure is at least a predetermined pressure, said means for biasing including a valve cylinder having opposite ends and a valve piston housed in said valve cylinder, said valve cylinder including a second inlet port adapted to be operably connected to the source of hydraulic fluid pressure, and said valve piston being operable to bias said valve member toward said valve seat when the hydraulic fluid pressure in one of said opposite ends of said valve cylinder is at least the predetermined pressure, and

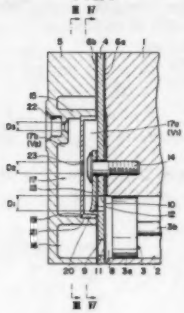
means for resiliently biasing said valve member away from said valve seat such that said valve member will move away from said valve seat when the hydraulic fluid pressure in said one of said opposite ends of said valve cylinder falls below the predetermined pressure, said means for resiliently biasing including a compression spring engaging the other of said opposite ends of said valve spool to bias said valve member away from said valve seat.

4,715,790
COMPRESSOR HAVING PULSATING REDUCING MECHANISM

Takeo Iijima; Hiroshi Nomura; Susumu Saito, and Susumu Echizen, all of Konan, Japan, assignors to Diesel Kiki Co., Ltd., Tokyo, Japan

Filed Mar. 6, 1986, Ser. No. 837,286
Claims priority, application Japan, Mar. 12, 1985, 60-48798
Int. Cl.[4] F04B *1/18, 39/00*
U.S. Cl. 417—269 **4 Claims**

FIG. 1



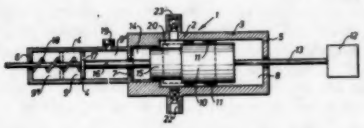
1. A compressor having a pulsating reducing means, said compressor comprising:
- a cylinder block having a plurality of cylinder bores therein;
- a plurality of pistons slidable in said cylinder bores;
- means connected to said pistons for driving said pistons with a predetermined phase difference between the strokes of the respective pistons;
- a valve plate on one end of said cylinder block and having a plurality of sets of at least one suction hole and at least one discharge hole, one set being positioned over the end of each of said cylinder bores;
- a suction valve in each suction hole for opening and closing said suction hole;
- a discharge valve in each discharge hole for opening and closing said discharge hole;
- a hollow cylinder head on said one end of said cylinder block over said valve plate and sandwiching said valve plate between it and said one end of said cylinder block;
- said cylinder head having a discharge opening therein and a partition plate therein partitioning said cylinder head into a first high pressure chamber into which said discharge holes open and a second high pressure chamber out of which said discharge opening opens, and said partition plate having a communicating hole therein communicating said first high pressure chamber and said second high pressure chamber, the diameter D_1 of the smallest cross section of said discharge holes, the diameter D_2 of said communicating hole and the diameter D_3 of said discharge opening being in the relationship $D_1 > D_2 > D_3$.

4,715,791
METERING PUMP

Bo Berlin, Staffanstorp, and Gert Nedstedt, Eslöv, both of Sweden, assignors to Tetra Pak International AB, Lund, Sweden

Filed Aug. 18, 1986, Ser. No. 897,251
Claims priority, application Sweden, Aug. 21, 1985, 8503891
Int. Cl.[4] F04B *5/00, 49/00*
U.S. Cl. 417—274 **5 Claims**

1. In an arrangement for the flow controlled feed of a medium into an outer flow system, having a movable pump piston and a metering chamber connectable to the flow system via a valve controlled inlet and outlet for the intake and discharge respectively of the medium in time with the working cycles of the pump piston, the improvement comprising a cylinder body delimiting the metering chamber and being displaceable in the metering chamber to make possible a variation in volume of this chamber, said cylinder body being loaded by a spring which endeavors to displace the cylinder body into the metering chamber towards a front surface of the pump piston and being connected to a rod which is displaceable in a casing with end walls and a side wall and in which is supported a sealing plate serving as a sliding piston, one side of said sealing plate

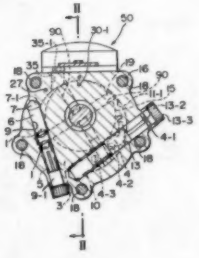


being loaded by the spring for displacement of the cylinder body into the metering chamber and the other side of said sealing plate forming a movable end wall for a chamber which through an inlet duct is connectable to an outer source for pressure medium for inflow of this medium into the chamber for the return-movement of the sealing plate and the pump piston connected therewith via the rod from the metering chamber.

4,715,792
VARIABLE CAPACITY VANE TYPE COMPRESSOR

Kazutoshi Nishizawa, Toyoake; Masashi Takagi, Kariya, and Akio Matsuoka, Obu, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Apr. 4, 1986, Ser. No. 848,230
Claims priority, application Japan, Apr. 5, 1985, 60-51376[U]
Int. Cl.[4] F04B *49/00*
U.S. Cl. 417—295 **8 Claims**



1. A variable capacity vane type compressor comprising:
- a housing providing a cylinder of a predetermined profile having ends closed by end walls;
- a rotor disposed in said cylinder and rotatable by an external power;
- said rotor being formed therein with a plurality of vane grooves;
- vanes slidably received in said vane grooves and having radially outer ends disposed in slidable engagement with the inner surface of said cylinder to cooperate therewith and with said end walls to define a plurality of variable volume working chambers;
- means defining a suction port so disposed as to be open to one of said working chambers when it is in its suction stroke;
- an unloading mechanism including an unloading port and a first unloading passage and arranged such that said unloading port is open to one of said working chambers when it is in its compression stroke and to relieve therefrom compressed fluid through said unloading passage to a lower pressure part of the compressor;
- means defining a discharge port so disposed as to be open to

one of said working chambers when it is in its final stage of the compression stroke;

said unloading mechanism further including a first valve member movable to vary the opening area of said unloading port;

means for controlling the suction of fluid into the compressor and including a second passage and a second valve member movable therein to vary the opening area of said suction port;

said second passage having first and second portions communicated, respectively, with said suction port and said cylinder at a point which leads said suction port as viewed in the direction of rotation of said rotor;

said first and second valve members having pressure receiving faces, respectively, and being movable by a pressure applied to said pressure receiving faces;

means for exerting the same pressure signal to said pressure receiving faces of said first and second valve members;

said second valve member being formed therein with a third communication passage which, when said second valve member is in a position in which the opening area of said suction port is decreased most, communicates said suction port through said first and second portions of said second passage with said point of said cylinder.

4,715,793

FLOW REGULATING ROTARY VANE PUMP

Merz Johann, Schwäbisch Gmünd, and Seidl Günther, Heubach, both of Fed. Rep. of Germany, assignors to Zahnradfabrik Friedrichshafen, AG., Friedrichshafen, Fed. Rep. of Germany

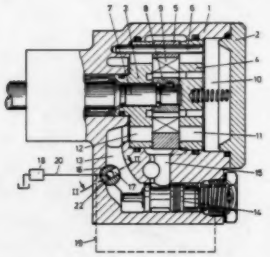
PCT No. PCT/EP85/00384, § 371 Date Apr. 3, 1986, § 102(e) Date Apr. 3, 1986, PCT Pub. No. WO86/01261, PCT Pub. Date Feb. 27, 1986

PCT Filed Jul. 30, 1985, Ser. No. 857,756

Claims priority, application Luxembourg, Apr. 11, 1984, 00246

Int. Cl.[4] F04B *49/00*

U.S. Cl. 417—300 **11 Claims**



1. In a rotary vane pump having a pump pressure outlet and a pump suction inlet and having regulation of pressure agent flow to a consumer (18) by means of a bypass valve (14) operable by pump output pressure flow in a pump pressure outlet passage (13) whereby said bypass valve is shifted by differential pressure between said putput pressure and consumer pressure for opening flow to a bypass passage (15) to bypass pump outlet flow to the suction inlet flow of said pump for circulatory flow between said pump pressure outlet and pump suction inlet including a combining flow from a tank to the bypass passage;

the improvement which comprises a metering throttle member (21) disposed to receive pump outlet flow from said pressure outlet passage (13) to a throttle passage (17) in said throttle member and said throttle member having a metering throttle passage (22) connecting to said throttle passage

for passage of pressure agent flow to a consumer and effecting a reduced flow rate thereto by reason of high viscosity of cold pressure agent wherein initially cold pressure agent effects said reduced flow rate to increase circulatory flow and thus reduce the flow needed from a tank for maintaining full circulatory flow,

wherein said metering throttle passage (22) has an area cross section for flow which is small enough as compared to the wetted area of passage therethrough for a pressure agent so as to produce increased flow friction expediting pump regulation for a cold pressure agent during pump start up by effecting initial decrease of flow to a consumer to maintain said circulatory flow by operation of said bypass valve without increasing the flow of initially cold pressure agent from the tank to said bypass passage, thereby reducing noise at start up.

4,715,794

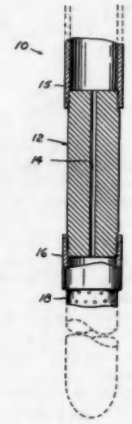
BOTTOM-HOLE PUMP FLUID FLOW CONTROLLER

Neal E. VanHooser, Rte. 3, Box 140-A, Pauls Valley, Okla. 73075

Filed Sep. 29, 1986, Ser. No. 912,873

Int. Cl.[4] F04B *21/02*

U.S. Cl. 417—313 **2 Claims**



1. In an oil well bottom hole pump having a depending threaded tubular fluid inlet end portion for communicating with a fluid passageway through the pump, the improvement comprising:

fluid controller means including a cylindrical member having an 8/64 inch (6.35 mm) axial bore axially connected with said inlet end portion,

the length of said member being not less than 2½ times its diameter and not greater than 7½ times its diameter.

4,715,795

METERING PUMP

Reiner Habrich, Kirchheim; Manfred Bauer, and Alois Reiter, both of Munich, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jan. 31, 1986, Ser. No. 825,143

Claims priority, application Fed. Rep. of Germany, Feb. 14, 1985, 8505108

Int. Cl.[4] F04B *21/02*

U.S. Cl. 417—568 **11 Claims**

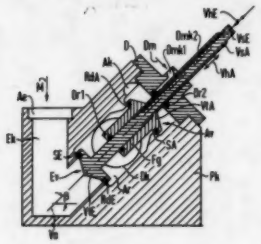
1. As metering pump including a pump head, particularly for metering liquid components of reaction resin compounds comprising:

a reciprocating displacement member;

an intake valve designed as a dish valve;

a discharge valve designed as a dish valve,

actuation elements arranged outside of said pump head to control said intake valve and said discharge valve, said valves having valve stems coaxially seated in the pump head which are actuated by said actuation elements,



said valve stem of said intake valve being coaxially seated in a valve disk and said valve stem of said discharge valve, and

an additional guide member for said valve stem of said intake valve being attached to said valve disk of said discharge valve.

4,715,796

SCROLL-TYPE FLUID TRANSFERRING MACHINE WITH LOOSE DRIVE FIT IN CRANK SHAFT RECESS

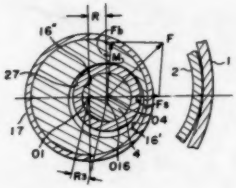
Tsutomu Inabe; Tadashi Kimura; Norihide Kobayashi; Masahiro Sugihara, and Tetsuzo Matsugi, all of Wakayama, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 21, 1986, Ser. No. 842,235

Claims priority, application Japan, May 16, 1985, 60-106318; May 16, 1985, 60-106307; Nov. 27, 1985, 60-268436

Int. Cl.[4] F01C *1/04, 17/06, 21/02*

U.S. Cl. 418—55 **6 Claims**



1. A scroll-type fluid transferring machine which comprises:

(a) a stationary scroll member and an oscillatable scroll member each of which has a spiral wrap of an involute curve or other curves projecting from a base plate, said stationary scroll member and said oscillatable scroll member cooperating to form a compression chamber between the spiral wraps and the base plates by mutually fitting one into the other;

(b) an oscillatable scroll shaft provided on the surface of the base plate of said oscillatable scroll member at the position opposite the spiral wrap of said oscillatable scroll member;

(c) a crank shaft having an axis and having an eccentric recess, said eccentric recess having an axis which is shifted by a predetermined distance from the axis of said crank shaft, said eccentric recess receiving said oscillatable scroll shaft to cause an oscillating movement of said oscillatable member;

(d) at least one main bearing for rotatably supporting said crank shaft;

(e) a bearing supporter for supporting said main bearing;

(f) means for preventing the rotation of said oscillatable scroll member around the axis of said oscillatable scroll shaft and for causing the oscillating movement of said oscillatable scroll member with respect to and inside of said at least one main bearing; and

(g) a cylindrical bush having coaxial outer and inner circumferences loosely fitted in said eccentic recess in said crank shaft with a gap between the outer circumference of said cylindrical bush and the inner wall of said eccentric recess, said oscillatable scroll shaft being fitted in the inner circumference of said cylindrical bush in a freely rotatable manner.

4,715,797

ROTARY-PISTON DISPLACEMENT MACHINE

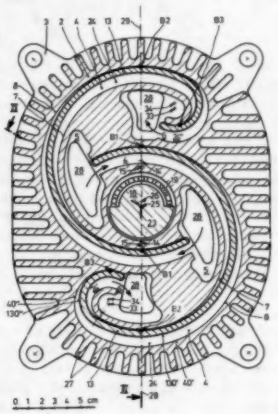
Heinrich Güttinger, Wettingen, Switzerland, assignor to BBC Brown, Boveri & Company, Ltd., Baden, Switzerland

Filed Apr. 22, 1986, Ser. No. 854,619

Claims priority, application Switzerland, Apr. 26, 1985, 1780/85

Int. Cl.[4] F04C *18/04, 23/00, 29/04*

U.S. Cl. 418—55 **6 Claims**



1. In a rotary-piston displacement machine for compressible media of the type having

two stationary delivery chambers which form a spiral in a stationary housing, encompass more than 360° and in each case lead from an inlet to an outlet, and having

a spiral displacer allocated to each delivery chamber and engaged into the latter, each displacer forms a spiral and encompasses more than 360°, is arranged as a band-shaped strip on a disk-shaped rotor eccentrically driven relative to the housing, and is mounted and guided with respect to the delivery chambers in order to execute a circulating, torsion-free movement, and

wherein the spiral shaped delivery chambers and displacers in each case consist of two portions, with a second portion continuously adjoining the outlet-side end of an initial portion which encompasses less than 360°, the radius of curvature of which second portion is substantially smaller than the minimum radius of curvature of the initial portion, so that the second portion is located between the outlet-side end and the center of the initial portion, the improvement wherein:

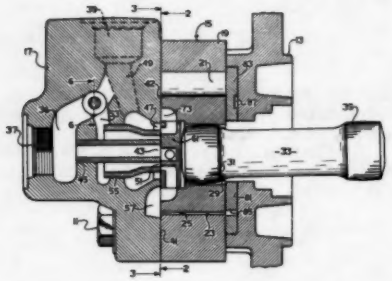
the spiral-like delivery chambers are arranged centrosymmetrically to one another in the absence of a common instantaneous center, and

the inlet-side ends of the delivery chambers are arranged around a drive mounting for the rotor, the drive mounting being located radially inwardly of the delivery chambers.

4,715,798
TWO-SPEED VALVE-IN STAR MOTOR

Marvin L. Berastrom, Eden Prairie, Minn., assignor to Eaton Corporation, Cleveland, Ohio

Continuation-in-part of Ser. No. 858,151, May 1, 1986. This application Jan. 28, 1986, Ser. No. 7,882
Int. Cl.[4] F01C *1/10, 21/14;* F03C *2/08*
U.S. Cl. 418—57 15 Claims



1. A rotary fluid pressure device of the type comprising housing means including an endcap member defining a fluid inlet port and a fluid outlet port; a gerotor gear set associated with said housing means and including an internally-toothed ring member, and an externally-toothed star member eccentrically disposed within said ring member: one of said ring member and said star member having orbital movement relative to the other of said members, and said star member having rotational movement relative to said ring member and said housing means; the internal teeth of said ring member and the external teeth of said star member interengaging to define a plurality N+1 of expanding and contracting fluid volume chambers during said relative orbital and rotational movements; shaft means and means operable to transmit said rotational movement of said star member to said shaft means: said endcap member defining a first fluid pressure chamber in continuous fluid communication with said one of said fluid inlet port and said fluid outlet port, and a second fluid pressure chamber in continuous fluid communication with the other of said fluid inlet port and said fluid outlet port; said star member defining a first manifold zone in continuous fluid communication with said first fluid pressure chamber, and a second manifold zone in continuous fluid communication with said second fluid pressure chamber; said star member including an end surface disposed toward said endcap member and defining first and second sets of fluid ports, said first set of fluid ports being in continuous fluid communication with said first manifold zone, and said second set of fluid ports being in continuous fluid communication with said second manifold zone, characterized by:

(a) said end surface of said star member being in sliding, sealing engagement with an adjacent surface of said endcap member;

(b) said endcap member defining a third fluid pressure chamber and a control fluid passage in communication with said third fluid pressure chamber;

(c) said star member defining a third manifold zone in continuous fluid communication with said third fluid pressure chamber:

(d) said end surface of said star member defining a third set of fluid ports in continuous fluid communication with said third manifold zone;

(e) said adjacent surface of said endcap member defining a plurality N+1 of valve passages, each of said valve passages being in continuous fluid communication with one of said expanding and contracting fluid volume chambers;

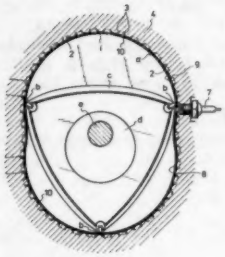
(f) said first, second, and third sets of fluid ports being in commutating fluid communication with said plurality N+1 of valve passages, defined by said endcap member, in response to said relative rotational movement of said star member; and

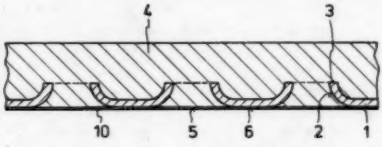
(g) valve means selectively operable between a first condition communicating said control fluid passage to said first fluid pressure chamber, and a second condition communicating said control fluid passage to said second fluid pressure chamber.

4,715,799
COMPOSITE CONSTRUCTION OF CASING FOR ROTARY PISTON ENGINE

Dankwart Eiermann, Weissensberg, Fed. Rep. of Germany, assignor to Wankel GmbH, Berlin, Fed. Rep. of Germany

Filed Apr. 25, 1986, Ser. No. 856,688
Claims priority, application Fed. Rep. of Germany, Apr. 25, 1985, 3514913
Int. Cl.[4] F01C *1/22, 21/10;* B22D *19/00*
U.S. Cl. 418—61 A 7 Claims





1. A housing mantle made in a composite construction for a rotary piston engine with a trochoidal-shaped two-arc mantle runway and a triangular piston having sealing strips arranged in corners thereof gliding along this mantle runway, such triangular piston rotating upon an eccentric of an eccentric shaft, comprising:

a layer of steel forming the mantle runway;

an outer layer of an aluminum alloy cast around this layer, said layer of steel forming the mantle runway having openings therein including radially outwardly bent-open edges therewith; and

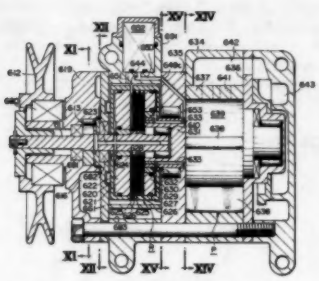
a cast metal forming said outer layer and cast to be filled-out as far as to a plane which coincides with a base plane of said layer forming said mentle runway so as to establish considerably improved direct heat-conducting contact between the mantle runway and aluminum of said housing mantle via the edges of the openings.

4,715,800

ROTARY COMPRESSOR WITH CLUTCH ACTUATED BY HYDRAULIC FLUID AND COMPRESSED FLUID

Kazutoshi Nishizawa, Toyoake; Masashi Takagi, Kariya; Akio Matsuoka, Obu, and Fuzio Nomura, Chiryu, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Continuation of Ser. No. 788,218, Oct. 16, 1985, abandoned.
This application Mar. 26, 1987, Ser. No. 31,179
Claims priority, application Japan, Oct. 17, 1984, 59-219236; Jul. 2, 1985, 60-145496
Int. Cl.[4] F04C *29/00*; F04B *35/00, 49/02*; F16D *25/063*
U.S. Cl. 418—69 10 Claims



1. A rotary compressor, comprising:

an input shaft;

a compressor component including a housing and a rotor member rotatably disposed in said housing and connectable to said input shaft, said housing defining at least one compression chamber having a volume varying with the rotation of said rotor member, a first pressurized working fluid being discharged from the compression chamber when said rotor member is connected to said input shaft and rotated thereby;

a clutch component including a first clutch cylinder, a first piston member disposed in said first clutch cylinder so as to be movable axially of said input shaft and cooperating with said first clutch cylinder to define therein a first pressure chamber, a second clutch cylinder connected to said rotor member for rotation therewith, a second piston member disposed in said second clutch cylinder so as to face to said first piston member but spaced therefrom axially of said input shaft and cooperating with said second clutch cylinder to define therein a second pressure chamber, a plurality of first clutch members disposed between said first and second piston members and mounted on said input shaft for rotation therewith, a plurality of second clutch members with one disposed between each pair of adjacent first clutch members and mounted on said second clutch cylinder for rotation therewith, said first and second clutch members being movable axially of said input shaft between an engaged position where said first and second clutch members engage with each other to allow a torque to be transmitted from said input shaft to said rotor member and a disengaged position where said first and second clutch members are disengaged form each other to prevent the torque from being transmitted from said input shaft to said rotor member, and biasing means for biasing said first and second clutch members toward said disengaged position;

a hydraulic pump drivingly connected to said input shaft for discharging a second pressurized working fluid upon the rotation of said input shaft;

first valve means movable between a first position where said second pressurized working fluid from said hydraulic pump is allowed to be applied to said first pressure chamber to cause said first piston member to move said first and second clutch members to said engaged position against the action of said biasing means and a second position where said second pressurized working fluid from said hydraulic pump is prevented from being applied to said first pressure chamber to cause said biasing means to move said first and second clutch members to said disengaged position; and

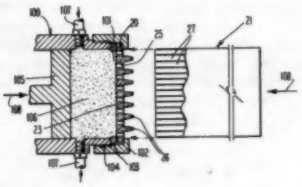
second valve means movable between a first position where said first pressurized working fluid from said compressor component is allowed to be applied to said second pressure chamber to cause said second piston member to move said first and second clutch members to said engaged position against the action of said biasing means and a second position where said first pressurized working fluid from said compressor component is prevented from being applied to said second pressure chamber to cause said biasing means to move said first and second clutch members to said disengaged position.

4,715,801

APPARATUS FOR HIGH SPEED MANIFOLDING OF HONEYCOMB STRUCTURES

Max R. Montierth, Elmira, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Division of Ser. No. 533,604, Sep. 19, 1983, which is a division of Ser. No. 283,734, Jul. 15, 1981, Pat. No. 4,411,856. This application May 2, 1985, Ser. No. 729,736
Int. Cl.[4] B29C *45/14*
U.S. Cl. 425—110 5 Claims



1. An apparatus for charging a flowable material into open ends of selected cells at an open end face of a honeycomb structure having an outer peripheral surface extending between said open end face and an opposite end face, said apparatus comprising:

a feed head having an exit orifice through which the flowable material is passed; and

a mask having a pair of opposing outer surfaces, a plurality of openings extending through said mask between and through said surfaces, and a plurality of protrusions extending from a first of said outer surfaces, said mask secured across said exit orifice with the second of said outer surfaces facing toward said exit orifice and said protrusions facing outward from said exit orifice and from said feed head, and said first surface and said protrusions are exposed so as to be able to be fitted against said open end face of aid honeycomb structure.

4,715,802

INJECTION MOLDING MACHINE

Takashi Arai, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 19, 1986, Ser. No. 876,079
Claims priority, application Japan, Jun. 27, 1985, 60-140742
Int. Cl.[4] B29C *45/16*
U.S. Cl. 425—130 2 Claims

1. An injection molding machine, comprising:

a valve holding member provided with a first passageway for introducing a first resin material from a first injection cylinder and a second passageway for introducing a second resin material from a second injection cylinder;

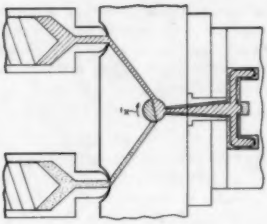
a valve rotatably held in a mating hole provided in said valve holding member, said valve assuming a substantially cylin-

drical shape and provided with a cut-away portion at the axially central position thereof;

a mold having a space for molding an article into which said resin materials are poured; and

a member having a pouring gate for pouring said first and second resin materials into said space;

said valve being constructed such that it is stopped at a first position and a second position by the rotational movement thereof, that in said first position, it pours the first resin material from said first injection cylinder into said space of



said mold through said first passageway, said cut-away portion and said pouring gate, and that in said second position, it pours the second resin material from said second injection cylinder into said space of said mold through said second passageway, said cut-away portion and said pouring gate, wherein the central portion of said valve is of a cylindrical shape, the opposite ends of said cylindrical shape assume a frusto-conical shape, and gaps for shearing leaked resin are provided between the frusto-conical portions of said valve and the inner surface of said mating hole of said valve holding member.

4,715,803

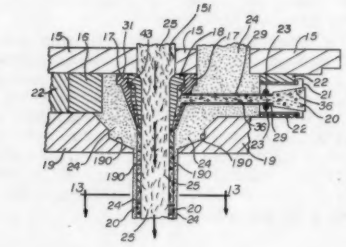
TRIPLE CO-EXTRUDER

Daniel A. Koppa, Bloomfield, N.J., assignor to Nabisco Brands, Inc., Parsippany, N.J.

Continuation of Ser. No. 724,206, Apr. 17, 1985, abandoned. This application Apr. 30, 1987, Ser. No. 45,229

Int. Cl.[4] A21C *3/04, 11/16*

U.S. Cl. 425—133.1 **1 Claim**



1. An extrusion apparatus for co-extruding three streams simultaneously and having three generally concentric flow passages defined by a die, said die comprising: three plates in face abutting relationship, a first of said plates being a block attached to means for extruding two materials, said block defining two side-by-side apertures, each being in communication with said means for extruding, an extrusion nozzle defining a generally cylindrical internal axial passage and a second annular orifice concentric with said passage, said nozzle having an internal sleeve member inserted within and radially spaced from a conical member to form both the internal passage and said annular passage with said conical member having a conduit fixed thereto and radially extending from the exterior of said conical member and in communication with said annular passage, a second plate abutting with said first of said plates, said conical member abutting said first of said plates such that a flow passage is defined by said internal axial passage communicating with a first of said apertures, a second of said apertures communicating with an aperture defined by said second plate and surrounding said nozzle, a third of said plates defining an extrusion orifice for the three streams, the second of said plates defining an opening extending generally parallel to a face of said plates through which said radially extending conduit projects for communication with a third extrusion means.

4,715,804

METAL MOLD FOR RESIN MOLDING

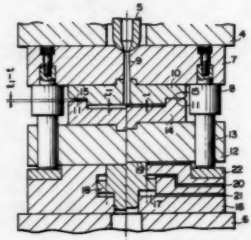
Mitsuo Takahashi, Matsudo, Japan, assignor to Seikoh Giken Co., Ltd., Chiba and Sumitomo Heavy Industries, Ltd., Tokyo, both of, Japan

Filed Apr. 15, 1986, Ser. No. 852,339

Claims priority, application Japan, Apr. 19, 1985, 60-84056

Int. Cl.[4] B29C *45/08, 45/67*

U.S. Cl. 425—141 **2 Claims**



1. A metal mold for resin molding, said mold having a substantially longitudinal axis, comprising

a fixed side metal mold assembly including

a fixed side metal mold plate having a lower surface extending transverse to said longitudinal axis; and

a fixed side upper cavity plate having an upper surface secured to the lower surface of said fixed side metal mold plate and a lower surface which includes a peripheral stepped flat portion;

a plurality of guide post rods attached to and projecting, in the direction of said longitudinal axis, from the lower surface of said fixed side metal mold plate, said guide post rods having ends located at a predetermined distance from the lower surface of said fixed side metal mold plate;

a movable side metal mold assembly including

a pressure receiving plate having an upper surface extending transverse to said longitudinal axis, the upper surface of said pressure receiving plate being in contact with the ends of said guide post rods;

a movable side metal mold plate having lower and upper surfaces, the lower surface thereof being supportable by the upper surface of said pressure receiving plate, said movable side metal mold plate being guided for movement in the direction of said longitudinal axis by said guide post rods; and

a movable side lower cavity plate having a lower surface secured to the upper surface of said movable side metal mold plate and an upper surface which includes a peripheral stepped flat portion, the peripheral stepped flat portion of the upper surface of said lower cavity plate being complementary to and cooperating with the peripheral stepped flat portion of the lower surface of said upper cavity plate, an injection cavity being defined between the lower and upper surfaces of said upper and lower cavity plates respectively;

means for injecting resin material into said injection cavity;

a hydraulic device secured to the lower surface of said movable side metal mold plate; and

means for applying pressure to said hydraulic device during injection of resin material into said cavity to bring the lower surface of said movable side metal mold plate into contact with the upper surface of said pressure receiving plate thereby making the thickness of the gap in said injection cavity equal to a first thickness, said means further applying pressure to said hydraulic device after resin material has been injected into said cavity to bring the complementary peripheral stepped flat surfaces of said upper and lower cavities into contact with each other thereby making the thickness of the gap in said injection cavity equal to a second thickness, wherein said first thickness is greater than said second thickness, the first thickness of said gap of said injection cavity being determined by the length of said guide post rods.

4,715,805

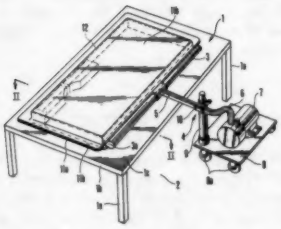
APPARATUS FOR VACUUM COMPRESSION OF LAMINATED SHEET MATERIAL

Nobuo Nasu, Fukuyama, Japan, assignor to Kabushiki Kaisha Kawakami Seisakusho, Hiroshima, Japan

Division of Ser. No. 913,528, Sep. 30, 1986. This application Mar. 23, 1987, Ser. No. 28,750

Int. Cl.[4] B28B *21/36*

U.S. Cl. 425—504 **6 Claims**



1. An apparatus for vacuum compressing a laminate consisting of a number of air-permeable sheets of a material, comprising:

a table having a supporting surface for supporting the laminate;

vacuum producing means for evacuating air from within a space defined by an air-impermable sheet covering a major portion of the periphery of the laminate, inclusive of a lower surface thereof, supported on said supporting surface;

a suction pipe arranged on said supporting surface along at least one side surface of the laminate and connected to said vacuum producing means, said suction pipe having a suction port facing the one side surface of the laminate; and

support means for supporting said suction pipe in such a manner that said suction pipe is capable of being moved in parallel relation to said supporting surface.

4,715,806

APPARATUS FOR THE PUNCHING AND REMOVING OF THE SPRUE IN AN INJECTION MOLDING TOOL

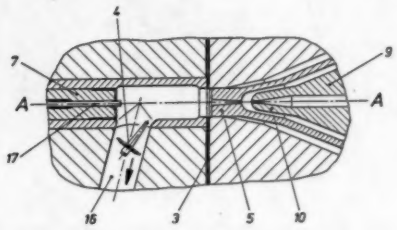
Ernst Ehrler, Munich; Martin Eichlseder, Tettenweis, and Edmund Theiss, Freising, all of Fed. Rep. of Germany, assignors to Krauss-Maffei A.G., Fed. Rep. of Germany

Filed Nov. 18, 1985, Ser. No. 799,337

Claims priority, application Fed. Rep. of Germany, Nov. 16, 1984, 3442023

Int. Cl.[4] B29C *45/38, 45/44*

U.S. Cl. 425—553 **9 Claims**



1. An injection molding tool comprising:

a first part of said injection molding tool partially defining a molded part cavity, said first part including

an axially arranged and axially displaceable punch exhibiting a first internal bore, and

an injection nozzle arranged axially to and positioned behind said punch wherein said first internal bore is in communication with said injection nozzle;

a second part of said injection molding tool partially defining a molded part cavity, said second part including;

an axially arranged and displaceable ejector;

an axially mobile ejector pin guided within said ejector;

an axially arranged sleeve around the ejector for guiding said ejector;

an orifice means in the sleeve for allowing removal of a punched sprue;

the ejector having a frontal side means facing the molded part cavity and aligned with the punch for acting as a die for said punch.

4,715,807

PULSE COMBUSTION DEVICE

Nobuyoshi Yokoyama, and Tsuneyasu Hayakawa, both of Nagoya, Japan, assignors to Paloma Kogyo Kabushiki Kaisha, Nagoya, Japan

Filed Jan. 27, 1987, Ser. No. 7,204

Claims priority, application Japan, Jan. 28, 1986, 61-10627[U]

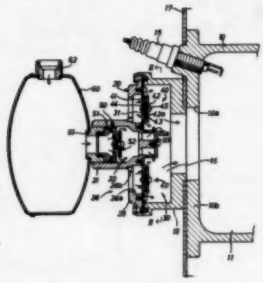
Int. Cl.[4] F23C *11/04*

U.S. Cl. 431—1 **5 Claims**

1. A pulse combustion device comprising a housing forming therein a combustion chamber, a cylindrical support member joined in a fluid tight manner to said housing to form a mixing chamber in open communication with the combustion chamber, an annular perforated flange member coupled with an open end of said support member, a cylindrical member mounted in the center of said flange member to form a gas passage in open communication with the mixing chamber, a flapper-type air inlet valve assembly mounted on said flange member to allow inward flow of air passing therethrough into the mixing chamber and to block outward flow of air from the mixing chamber, and a flapper-type gas inlet valve assembly disposed within said cylindrical member to allow inward flow of gaseous fuel passing therethrough into the mixing chamber and to block outward flow of the gaseous fuel from the mixing chamber,

wherein said air inlet valve assembly includes an annular valve plate formed with a plurality of circumferentially

equi-spaced air ports and being secured to annular end surfaces of said flange member and said cylindrical member, and a plurality of circumferentially equi-spaced air inlet valve units mounted on said valve plate on a common circular path concentric with the gas passage, said air inlet valve units each including a circular perforated backer plate arranged within the mixing chamber to oppose each of said air ports and fixed to said valve plate through a spacer, and a circular air flapper movable between said valve plate and said backer plate to be lifted off said air port when applied with negative pressure in the mixing chamber and to be seated over said air port when applied with positive pressure in the mixing chamber.



4,715,808

THERMOSTATIC CONTROL SYSTEM

Rodney T. Heath, 4901 E. Main, Farmington, N. Mex. 87401, and Charles R. Gerlach, 639 W. Rhapsody, San Antonio, Tex. 78216

Continuation of Ser. No. 625,023, Jun. 27, 1984, Pat. No. 4,615,673, and a continuation of Ser. No. 359,246, Mar. 18, 1982, Pat. No. 4,474,550. This application May 27, 1986, Ser. No. 866,765

Int. Cl.[4] F23N *1/00*

U.S. Cl. 431—18 **2 Claims**

1. A system for controlling the amount of natural supply gas delivered from a natural gas supply source to a natural gas burner adapted to continuously heat a process fluid or the like in a vessel or the like so as to continuously automatically maintain the temperature of the process fluid within a predetermined minimum range of temperatures above and below a pre-set nominal temperature during normal operating conditions comprising:

means for controlling the operation of the gas burner by varying the pressure of supply gas delivered to the gas burner by use of a control gas pressure operated flow regulator device in a natural gas supply line connecting the gas burner to the natural gas supply source;

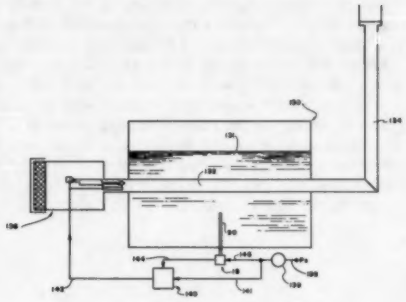
means for controlling the operation of said control gas pressure operated flow regulator device by varying the pressure of control gas delivered thereto from the gas supply source in accordance with variations in the temperature of the process fluid in the vessel;

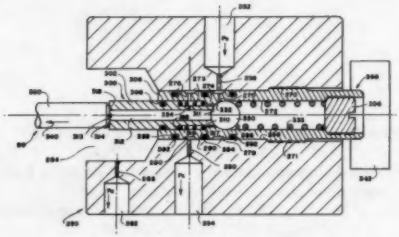
a bore having a supply gas orifice means through which supply gas is fed into said bore and a control gas orifice means through which said control gas is fed to said control gas pressure operated flow regulator device;

means for controlling the pressure of the control gas delivered to said gas operated flow regulator device by using a relatively substantially large variable orifice means as compared to said control supply gas orifice means;

means for controlling said relatively substantially large variable orifice means by changes in temperature so that a small change in temperature results in a relatively large change in the pressure of the control gas delivered to said control gas pressure operated flow regulator device;

said relatively substantially large variable orifice means being located between said supply gas orifice means and said control gas orifice means; and





means for attenuating changes in the pressure of the control gas delivered to said control gas pressure operated flow regulator device by bleeding gas through a relatively small fixed sized orifice leading from said bore to atmospheric pressure.

4,715,809

FLUIDIZED BED HAVING MODIFIED SURFACES IN THE HEAT EXTRACTOR

Josef Langhoff, Dinslaken; Hermann Krischke; Horst Geldmacher, both of Essen; Manfred Golomb, Bottrop; Karl-Heinz Kamp, Duisburg; Peter Masuch, Recklinghausen, and Rolf Chalupnik, Essen, all of Fed. Rep. of Germany, assignors to Ruhrkohle AG, Essen, Fed. Rep. of Germany

Filed Dec. 20, 1985, Ser. No. 811,920

Claims priority, application Fed. Rep. of Germany, Dec. 22, 1984, 3447186

Int. Cl.[4] F23D *21/00*; F28D *13/00*; F28F *19/00*

U.S. Cl. 431—170 **7 Claims**

1. A fluidized combustion bed having immersion heat exchanger tubular means, said tubular means having an inner surface and an outer surface;

said tubular means comprising a plurality of tubes spaced away from one another;

said bed having inlet means and outlet means for the flow of fluid therebetween;

said tubes being disposed substantially transverse to the flow in said bed;

said inner surface of said tubular means defining means for conducting a heat transferring medium through said tubular means;

said outer surface of said tubular means having protrusions extending therefrom;

said protrusions being disposed to deflect, at least partially,

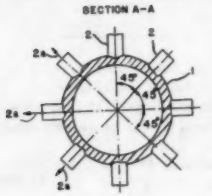
a flow of products of combustion in said fluidized bed from said outer surface; and

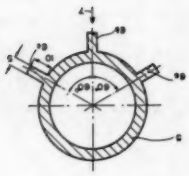
said protrusions being fins disposed on and protruding from said outer surface and distributed thereover, whereby erosion of said outer surface of said tubular means is minimized, said pins being disposed on said outer surface of said tubular means in encircling, circumferential rows of spaced pins, adjacent circumferential rows being angularly displaced from one another about the longitudinal axis of said tubular means.

4. A fluidized combustion bed having immersion heat exchanger tubular means, said tubular means having an inner surface, an outer surface, a top and a bottom;

said tubular means comprising a plurality of tubes spaced away from one another;

said bed having inlet means and outlet means for the flow of fluid therebetween;





said tubes being disposed substantially transverse to the flow in said bed;

said inner surface of said tubular means defining means for conducting a heat transferring medium through said tubular means;

said outer surface of said tubular means having protrusions extending therefrom;

said protrusions being disposed to deflect, at least partially, a flow of products of combustion in said fluidized bed from said outer surface;

said protrusions comprising fins disposed on and protruding from said outer surface and said fins being disposed solely on the upstream surface, with respect to the flow, of said tubular means;

said tubular means having a longitudinal axis; and

said fins being disposed to extend along said longitudinal axis of said tubular means.

4,715,810

PROCESS AND APPARATUS FOR REMOVING VOLATILES FROM METAL

Everett M. Ramsey, Richland; Bruce A. Gray, and Donald C. Evans, both of Newburgh, all of Ind., assignors to Aluminum Company of America, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 750,336, Jun. 28, 1985, abandoned. This application Jun. 26, 1986, Ser. No. 879,066

Int. Cl.[4] F26B *5/00*; **F26G** *13/00*

U.S. Cl. 432—8 **11 Claims**

1. A process for removing volatilizable contaminants from the surface of aluminum, comprising the steps of:

(a) shredding said aluminum into small pieces;

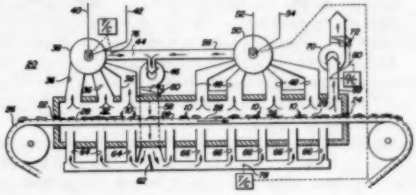
(b) transporting said small pieces through a furnace;

(c) heating said small pieces in a first zone of said furnace to vaporize said volatiles, said vaporizing producing fumes containing unburned hydrocarbons;

(d) burning said fumes containing unburned hydrocarbons to produce hot gas having a temperature of between 1000° and 1500° F.;

(e) mixing said hot gas with a cooler gas to produce a recirculating gas having a temperature of between 900° and 1100° F.;

(f) routing a portion of said recirculating gas to said first



zone of said furnace and introducing sufficient air to heat incoming aluminum and vaporize volatiles contained on the surface thereof and routing the remaining portion of said recirculating gas to a second zone of said furnace where said gas contacts said aluminum leaving said first zone and pyrolyzes said aluminum to remove any carbon present on the surface thereof; and

(g) positioning a temperature sensing device in said furnace for measuring the temperature of said recirculating gas and controlling the amount of air and fuel supply to a burner such that the temperature of said hot gas leaving said burner is maintained between 1000° and 1500° F.

4,715,811

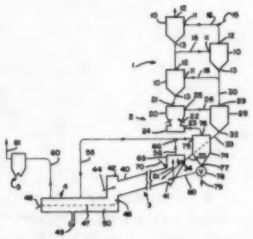
PROCESS AND APPARATUS FOR MANUFACTURING LOW SULFUR CEMENT CLINKER

Thomas R. Lawall, Emmaus, Pa., assignor to Fuller Company, Bethlehem, Pa.

Division of Ser. No. 750,437, Jul. 1, 1985, Pat. No. 4,662,945. This application Jul. 3, 1986, Ser. No. 882,125

Int. Cl.[4] F27B *15/00*

U.S. Cl. 432—58 **4 Claims**



1. Apparatus for producing low sulfur cement clinker comprising:

a rotary kiln having a feed end and a discharge end with an inlet for fuel at the discharge end for establishing a burning zone near the discharge end;

a clinker cooler flow connected to the discharge end of the kiln;

a stationary calcining furnace having an inlet for cement raw meal to be calcined, an inlet for fuel, an inlet for air for combustion and an outlet for spend combustion air and calcined cement raw meal;

a first gas solids separator having an inlet for spent combustion air and calcined cement raw meal, an outlet for separated gas, and an outlet for separated calcined cement raw meal;

a first duct flow connecting the outlet for spent combustion air and calcined cement raw meal of the calcining furnace to the inlet for spent combustion air and calcined cement raw meal of the first gas solids separator;

a second duct flow connecting the outlet for separated calcined cement raw meal of the first gas solids separator to the feed end of the rotary kiln;

a riser duct flow connecting the feed end of the kiln to the inlet for air for combustion of the calcining furnace for discharging combustion gas from the kiln;

means for supplying fuel to the riser duct for producing in the riser duct reducing conditions and a temperature for decomposing sulfur compounds which may be contained in the cement raw meal and the fuel;

means for supplying fresh air to the riser duct;

means for diverting a portion of the calcined cement raw meal from said second duct to the riser duct for absorbing decomposed sulfur oxides discharged from the feed end of the kiln with combustion gas; and

separator means for separating the absorbed sulfur compounds from spent combustion gas and fresh air and having an inlet connected to the riser duct and an outlet for spent combustion gas and fresh air connected to the calcining furnace, and an outlet for absorbed sulfur compounds.

4,715,812

KILN FURNITURE

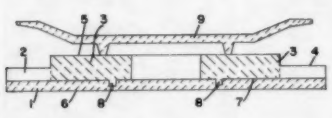
Alfred G. von Matuschka, Sauerlach-Altkirchen; Klaus Liethschmidt, Frechen-Grefrath; Hubertus Webert, Kerpen-Horrem, and Emil K. Köhler, Berchtesgaden-Oberau, all of Fed. Rep. of Germany, assignors to Elektroschmelzwerk Kempten GmbH, Munich, Fed. Rep. of Germany

Filed Apr. 21, 1986, Ser. No. 854,046

Claims priority, application Fed. Rep. of Germany, May 8, 1985, 3516490

Int. Cl.[4] F27B *21/00*

U.S. Cl. 432—258 **8 Claims**



1. Kiln furniture for supporting ceramic products to be baked in a high-speed baking kiln, comprising:

a laminar support including a needled blanket impregnated with an inorganic binder or a binder-free needled blanket, said blanket having a lower stack-up surface in contact with a conveyor surface of said kiln and an upper surface with a plurality of depressions in the form of preformed slots and/or grooves therein; and

a plurality of separate segment-like basic bodies made of a ceramic material and fitted in said depressions on said blanket, said basic bodies being relatively small, having simple shapes and having cross-sections resistant to thermoshock, said basic bodies together forming an emplacement surface for supprting said ceramic products to be baked in said high-speed baking kiln.

4,715,813

METHOD OF DETERMINING MATERIALS OF SUITABLE COLOURS FOR A TOOTH REPAIR LAYER OF PROSTHESIS FACET, AND A SAMPLE SET FOR APPLYING THIS METHOD

Ernst Mühlbauer, Fangdieckstrasse 61, 2000 Hamburg 53, Fed. Rep. of Germany

Filed Jul. 1, 1986, Ser. No. 880,733

Claims priority, application Fed. Rep. of Germany, Jul. 4, 1985, 3523982

Int. Cl.[4] A01C *19/00*

U.S. Cl. 433—26 **10 Claims**

1. An assembled sample for determining materials of suitable colors for the base and top layer of a tooth repair component, comprising:

a base layer color sample;

a top layer color sample;

wherein one of the base or top layer color samples is in the form of a liquid optically connected without bonding to the other layer.

4,715,814

ARTICULATOR

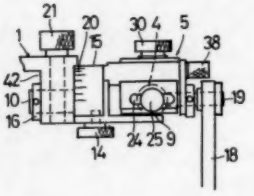
Koide Kaoru, Niigata, and Nagai Sadao, Urawa, both of Japan, assignors to Takamiya Dental Manufacturing Company Limited, Tokyo, Japan

Filed Mar. 3, 1986, Ser. No. 835,262

Claims priority, application Japan, Jun. 12, 1985, 60-127709

Int. Cl.[4] A01C *11/00*

U.S. Cl. 433—59 **4 Claims**



1. An articulator convertible between an archon box type and an archon slot type, comprising:

an upper jaw arciform and a lower jaw arciform for mounting a gypsum model;

a pair of right and left condylar spheres provided at the rear of the lower jaw arciform;

condyle path plates provided at the rear of the upper jaw arciform for supporting the condylar spheres;

the condyle path plates including a rear wall contacting the rears of the condyle spheres, side walls contacting the sides of the condyle spheres and a lower wall contacting the lower portion for preventing the condyle path plate from floating; said lower wall being detachable;

whereby attachment and removal of said lower wall permits conversion, respectively, between an archon slot type and an archon box type.

4,715,815

DENTAL ARTICULATOR

Hans Rossner, Ulmerstr. 11, D-8940 Memmingen, Fed. Rep. of Germany

Filed Sep. 19, 1985, Ser. No. 777,926

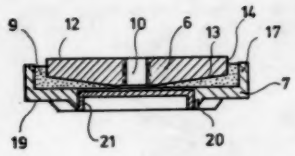
Claims priority, application Fed. Rep. of Germany, Apr. 1, 1985, 3511928

Int. Cl.[4] A61C *11/00*

U.S. Cl. 433—60 **17 Claims**

1. A dental articulator comprising an arm; a first support on said arm; a second support arranged to carry a dental model; and means for adjustably coupling said second support to said

first support, comprising a mass of plastic material which is rigid a first temperature range and is ductile within a second temperature range so that the mutual positions of said supports can be repeatedly altered by rendering the plastic material



ductile, said second support including a receptacle having a bottom wall and a sidewall defining with the bottom wall a compartment containing the mass of plastic material, at least a portion of said first support being at least partially embedded in said mass within said compartment.

4,715,816

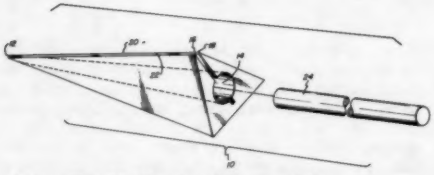
ADJUSTABLE DENTAL WEDGING SYSTEM

Andrew Mogelof, 298B South Trail, Stratford, Conn. 06497

Filed Aug. 25, 1986, Ser. No. 900,302

Int. Cl.[4] A61C *7/00*

U.S. Cl. 433—149 **7 Claims**



1. An adjustable dental wedge, comprising:

a wedge of resilient material having a central bore positioned parallel to an axis, said wedge being essentially a trihedron, said wedge further having two opposed leaves formed along said axis separating from said bore to one apex of said wedge.

4,715,817

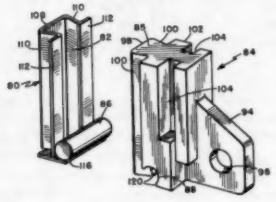
DENTURE ATTACHMENT STRUCTURE AND METHOD

Max Znest, 595 San Fernando, San Diego, Calif. 92106, and Paul Znest, 13531 Orange Blossom La., Poway, Calif. 92064

Continuation-in-part of Ser. No. 765,811, Aug. 15, 1985, abandoned. This application Jun. 19, 1986, Ser. No. 876,265

Int. Cl.[4] A61C *13/22*

U.S. Cl. 433—181 **19 Claims**



1. An attachment structure for securing a denture to an existing tooth or tooth substitute, comprising:

an insert member for securing to a denture;

a retainer member for securing in a cut-out in an existing tooth or tooth substitute;

one of the members having an elongate, open faced channel and the other member having a corresponding elongate tongue which is a frictional sliding fit in the channel in the direction of insertion of a denture in an oral cavity;

the channel and tongue having cooperating interengageable snap fit formation at their lower ends for snap fit engagement when the tongue is fully inserted in the channel, one of the formations comprising a socket and the other formation comprising a head of corresponding shape to the socket; and

the head and socket being elongated in a direction transverse to the longitudinal axes of the tongue and channel and each being of length greater than the transverse width of the tongue and channel so that they project outwardly on opposite sides of the tongue and channel.

4,715,818

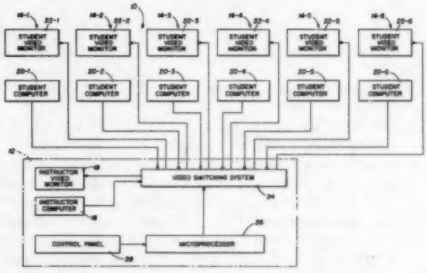
COMPUTER TRAINING SYSTEM

Ronald L. Shapiro, 11219 Empire Ln., Rockville, Md. 20852, and Raymond M. Thompson, Jr., Washington, D.C., assignors to Ronald Lewis Shapiro, Rockville, Md.

Filed Dec. 4, 1984, Ser. No. 677,998

Int. Cl.[4] G09B *19/00*

U.S. Cl. 434—118 **13 Claims**



1. A computer training system adapted for instruction of a student individually, or a plurality of students simultaneously, particularly in a classroom environment, which comprises:

an instructor work station which includes a computer having an associated video monitor upon which an instructor can produce displays using the instructor work station computer;

at least one student work station which includes a computer having an associated video monitor upon which a student can produce displays using the student work station computer;

first switching means operable by the instructor at the instructor work station for selectively connecting the student work station computer and video monitor to the instructor work station video monitor so that displays being produced on the student work station video monitor by the student are displayed on the instructor work station video monitor to enable the instructor to monitor the work of the student; and

second switching means operable by the instructor at the instructor work station for selectively connecting the instructor work station computer and video monitor to the student work station video monitor, and disconnecting the student work station video monitor from the student work station computer while connecting the instructor work station computer and video monitor to the student work station video monitor, so that displays produced by the instructor on the instructor work station video monitor using the instructor work station computer, also are displayed on the student work station video monitor for instruction of the student by the instructor without disturbing work which has been inputted into the student work station computer.

4,715,819

CONNECTOR FOR PRINTED BOARD CONNECTION

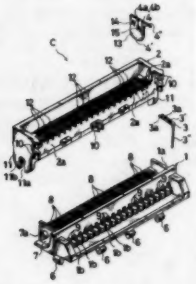
Yoshihiro Iwasa; Toru Masuda, and Yasuji Shibano, all of Osaka, Japan, assignors to Hosiden Electronics Co., Ltd., Japan

Continuation of Ser. No. 721,511, Apr. 9, 1985, abandoned. This application Aug. 19, 1986, Ser. No. 898,780

Claims priority, application Japan, Apr. 12, 1984, 59-54614[U]

Int. Cl.[4] H01R *39/00*

U.S. Cl. 439—31 13 Claims



1. A connector for connecting printed circuit boards, comprising:

a first body having a plurality of first contacts to be connected with a printed wiring of a first circuit board and means of the first body for mounting a first circuit board thereto, each of said plurality of first contacts comprises a fork-shaped contact member including projecting contact portions facing each other with a contact area defined on each contact portion, said contact areas being spaced apart in the projecting direction of the contact portions;

a second body facing the first contacts of said first body, said second body having a plurality of second contacts to be connected with the printed wiring of a second circuit board and means on the second body for mounting a second circuit board thereto; and

means associated with each body according to which said first body and said second body are turnably and detachably connected with each other, each of said first contacts and of said second contacts being brought into contact with each other within a turning range of the two bodies.

4,715,820

CONNECTION SYSTEM FOR PRINTED CIRCUIT BOARDS

Howard W. Andrews, Jr., Hershey; Charles S. Pickles, Hummelstown, and Attalee S. Taylor, Palmyra, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Sep. 29, 1986, Ser. No. 913,183

Int. Cl.[4] H01R *9/09;* H05K *1/10*

U.S. Cl. 439—59 8 Claims

1. A connection system for electrically interconnecting circuits on a printed circuit mother board and on a printed circuit daughter board, said system comprising:

first connector having an elongated slot opening outwardly and a plurality of electrical contact means with spring means disposed on both sides of said slot and pin means extending outwardly therefrom for electrical engagement with circuits on the mother board; and

a second connector comprising housing means and electrical contact means, said housing means including an elongated, outwardly extending blade means on one side, slot means in an opposite side for receiving the daughter board, cavities on each side of said slot with said cavities on one side being longitudinally offset relative to the facing cavities and further said cavities communicating with said slot through notches with the notches on one side of said slot facing the notches on the other side, said contact means having finger means disposed on said blade means for electrically engaging said spring means upon inserting said blade means in said slot in said first connector, said contact means further having contact are means disposed in said cavities and projecting into said slot

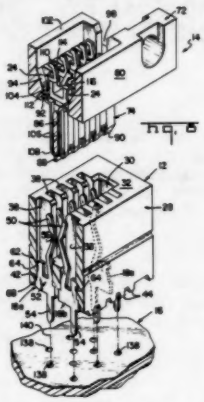


Fig. 6

through said notches for electrically engaging circuits on the daughter board which may be inserted in said slot means and further having spring section means intermediate said finger means and contact arm means, said section means having a concave-convex shape to provide an elongated spring section over a short linear distance, said contact arm means being formed normal to the plane of said finger means and spring section means.

4,715,821

COAXIAL PLUG FOR USE IN A JUNCTION BETWEEN A COAXIAL CONDUCTOR AND A STRIPLINE

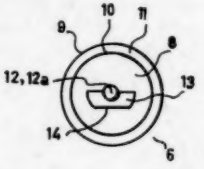
Claes E. S. Axell, Askim, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

Filed Aug. 28, 1986, Ser. No. 901,126

Claims priority, application Sweden, Oct. 3, 1985, 8504588

Int. Cl.[4] H05K *1/00*

U.S. Cl. 439—59 9 Claims



1. A coaxial plug for use between a coaxial conductor located externally of an apparatus box and a stripline with a conductive ground plane located within the box, comprising:

an insulating plate, the stripline and ground plane each being located on a respective side of said plate;

an end wall on said coaxial plug;

means for connection with the stripline, said means being a centre pin in said coaxial plug;

means for connection with said ground plane, said means being a conductive outer casing of said coaxial plug;

a projecting part of said coaxial plug projecting outwardly from said end wall and in contact with said conductive outer casing, said centre pin and said projecting part terminating substantially edge-to-edge at substantially equal

distances from said end wall and adjacent said insulating plate; and

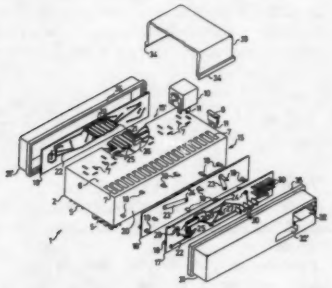
planar surface means included on said projecting part at a location remote from said centre pin for bonded connections between said centre pin and the stripline and between said planar surface means and the ground plane, respectively.

4,715,822

ELECTRICAL CONNECTION DEVICE FOR A MOTOR VEHICLE

Hans P. Stribel, Nürtingen, Fed. Rep. of Germany, assignor to Stribel GmbH, Frickenhausen, Fed. Rep. of Germany

Filed Jul. 14, 1986, Ser. No. 885,167
Int. Cl.[4] H01R 9/09
U.S. Cl. 439—74 16 Claims



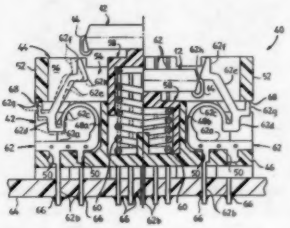
1. A device for centralized inteconnection of electric components of a motor vehicle, such as safety fuses, plug-in connectors, wiring harnesses, switching apparatuses for electric consuming circuits and electronic control devices for the electric consuming circuits, comprising a pack of vertically superposed flat conductors separated from each other in horizontal and vertical directions by insulating means, said flat conductors being made of sheet metal to withstand high currents flowing through the electric consuming circuits, and the insulating means delimiting opposite lateral sides of the pack; a plurality of connector sockets arranged above the uppermost flat conductors to receive the plug-in connectors; at least a part of the uppermost flat conductors being connected to said connector sockets; a plurality of connector pins projecting from at least one lateral side of said pack at different levels of said flat conductors, the connector pins at the uppermost level being connected to said part of the uppermost flat conductors and the remaining connector pins to assigned intermediate flat conductors; a first conductor plate supporting components of at least one electronic control device for a consuming circuit of the motor vehicle, said first conductor plate being fixedly arranged at said one lateral side opposite said projecting connector pins and further supporting bridging conductors for interconnecting selected connector pins at the uppermost and intermediate levels to provide a desired interconnection of said connection sockets; and at least one separate switching apparatus having a plug-in connector detachably inserted in assigned ones of said connector sockets to switch a consuming circuit in the motor vehicle.

4,715,823

PLUG-IN SOCKET ASSEMBLY FOR INTEGRATED CIRCUIT PACKAGE

Toyokazu Ezura; Fujio Katsumata, and Kiyokazu Ikeya, all of Shizuoka, Japan, assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Nov. 21, 1986, Ser. No. 934,063
Claims priority, application Japan, Dec. 31, 1985, 60-299100
Int. Cl.[4] H01R 9/09
U.S. Cl. 439—267 20 Claims



1. A plug-in socket assembly for use with a semiconductor integrated circuit package unit having a plurality of contact pins arranged along at least one side of the integrated circuit package unit, the socket assembly having a first direction in which the integrated circuit package unit is to be placed into the socket assembly and a second direction opposite to the first direction, comprising

(a) a support member,

(b) a housing member movable toward the support member in said first direction and away from the support member in said second direction, the housing member defining an open space adapted to have said integrated circuit package unit accommodated therein,

(c) a carrier member for having said integrated circuit package unit detachably supported thereon, the carrier member being mounted on said support member and being movable with respect to each of said support member and said housing member in said first direction into and in said second direction out of a position in which the integrated circuit package unit supported thereon assumes a predetermined position within said open space with respect to said support member.

(d) a plurality of contact elements supported on said support member and each extending in part in said support member, each of the contact elements having (i) a seat portion disposed on said support member, (ii) a spring portion leading from said seat portion and arcuately curved at least in part away from said open space laterally of the socket assembly, (iii) an elongated arm portion merging out of said spring portion toward said open space laterally of the socket assembly, (iv) an inner lug portion leading from said arm portion and engageable with one of said contact pins of said integrated circuit package unit when the integrated circuit package unit is in said predetermined position within said open space, and (v) an outer lug portion merging out of said arm portion and located outwardly of said inner lug portion laterally of the socket assembly, said housing being formed with a surface portion which is received on said outer lug portions of said contact elements.

4,715,824
CONNECTOR FOR INTERCONNECTING CABLE TO A PRINTED CIRCUIT BOARD

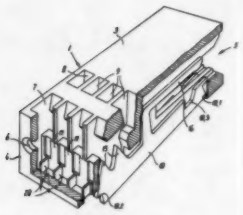
Laurentius M. Verhoeven, Rv Veghel, Netherlands, assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 3, 1986, Ser. No. 937,500

Claims priority, application Netherlands, Dec. 4, 1985, 8503347

Int. Cl.[4] H01R 4/24

U.S. Cl. 439—391 **6 Claims**



1. A connector for interconnecting a multiconductor cable having a plurality of conductors, each surrounded by insulation material, with a printed circuit board comprising:

a block-shaped insulation housing having a first section for receiving the conductors of the cable at one end, and a second section terminating in the form of a U-shape at the other end of the housing capable of being connected to the printed circuit board,

a plurality of partitions aligned longitudinally along said connector housing, said partitions defining in said one section a plurality of conductor receiving channels and in said second section a plurality of parallel grooves,

a plurality of openings at said one end of the housing and aligned with said channels so that the conductors are individually inserted and received within the channels of said first housing section,

a plurality of long, flat contact springs adapted for insertion in each of the parallel grooves, each said contact psring having at the end to be inserted in the first housing section at least one tooth capable of piercing through the insulation material of and making electrical contact with the conductor received in the channel which is aligned with the groove in which said contact spring is inserted, the other end of each said contact spring being adjacent said other end of the housing and terminating in a U-shaped spring part with a first and second leg, said first leg designed for electrically contacting a corresponding contact strip on the printed circuit board, said first and second legs and said one tooth being disposed in approximately the same plane as the rest of the contact spring.

4,715,825
CONNECTOR WITH PIERCE CONTACT ELEMENT HAVING REDUCED WEAR CROWN

Bob Mouissie, Ek Berlicum, and Hubertus B. Libregts, Xr Vlijmen, both of Netherlands, assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 793,131, Oct. 30, 1985, abandoned. This application Mar. 25, 1987, Ser. No. 31,148

Claims priority, application Netherlands, Nov. 9, 1984, 8403432

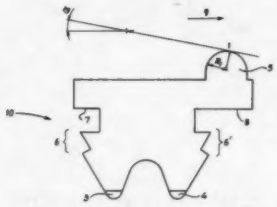
Int. Cl.[4] H01R 4/24

U.S. Cl. 439—391 **6 Claims**

1. A connector for a cable having at least one insulated conductor wherein electrical connection with said conductor is made within the housing by axially piercing the end face of the conductor, said connector comprising:

a insulation housing with said insulated conductor inserted through an aperture in a sidewall of the housing,

a pierce contact element inserted through an opposite sidewall of housing, said contact element including a base from which projects a pointed tang and two arms, one arm on either side of the pointed tang, both arms being provided with teeth along their inside edges, said inside edges running parallel to from the center line of the pointed tang and at a distance therefrom which is adjusted to the dimensions of the housing whereby when the pierce contact



element is inserted into the housing, the pointed tang pierces axially into the end face of the conductor and the teeth of the arms penetrate into and grip portions of the connector housing surrounding the conductor which has been pierced axially by the tang, said contact element further including a contact crown projecting from said base, said contact crown adapted to electrically contact a contact strip or contacting wire in a matching connector.

4,715,826
CIRCUIT BOARD CONNECTOR

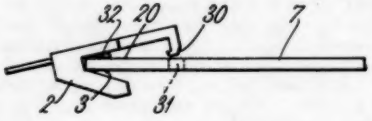
John C. Collier, Skelmersdale, and Keith Davies, St. Helens, both of England, assignors to BICC Public Limited Company, London, England

Filed Sep. 3, 1986, Ser. No. 903,384

Claims priority, application United Kingdom, Sep. 3, 1985, 8521843

Int. Cl.[4] H01R 4/24

U.S. Cl. 439—438 **7 Claims**



1. An electrical edge connector for a circuit board having an edge with at least one contact pad present on or adjacent the edge; the connector comprising an insulating housing, the housing defining an aperture for receiving an edge of a circuit board; at least one metallic connector pin extending from the housing, the connector pin having a sharp-edged male contact region plated with a ductile metallic material, said sharp-edged region being capable of penetrating and deforming a similarly plated contact pad to establish a low resistance electrical connection therebetween; wherein the connector is such that a circuit board and the housing are pivotable with respect to one another between a first position in which there is clearance between the connector pin and the contact pad present on the circuit board, and a second position in which the connector pin penetrates and deforms said contact pad such that the connector pin and the contact pad are in low resistance electrical contact one with the other; and there is provided securing means for holding a circuit board with respect to the housing in the second position.

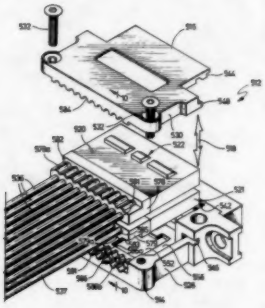
4,715,827
MODULAR CONNECTOR SYSTEM

Lev B. Furman, York, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Continuation-in-part of Ser. No. 729,102, Apr. 30, 1985, Pat. No. 4,632,495, Ser. No. 729,103, Apr. 30, 1985, abandoned, and Ser. No. 729,104, Apr. 30, 1985, abandoned. This application Apr. 17, 1986, Ser. No. 853,306

Int. Cl.[4] H01R *13/502*

U.S. Cl. 439—465 **44 Claims**



1. A connector comprising a housing, at least one module adapted to be received within said housing, said module including means for receiving a plurality of electrical conductors therein, and positioning means for positioning said module within said housing, characterized in that,

said housing includes a receiving portion and a cover portion,

said cover portion being releasably mountable to said receiving portion for releasably enclosing said module within said housing,

said positioning means includes locking means on said housing and said module for locking said module laterally and longitudinally within said housing,

said locking means including an interengaging ribbed structure and channel structure on said housing and said module,

said module includes means for receiving a plurality of rows of conductor wires,

said cover portion includes first and second portions releasably mountable to opposite sides of said receiving portion.

4,715,828
ELECTRICAL CONNECTION FOR ELECTRONIC CIRCUITS

Jacques Landrevie, La Chambre, France, assignor to Societe Nouvelle Rockall France S.A., Vitre, France

Filed Nov. 27, 1985, Ser. No. 802,774

Claims priority, application New Zealand, Dec. 4, 1984, 210422

Int. Cl.[4] H01R *13/04*

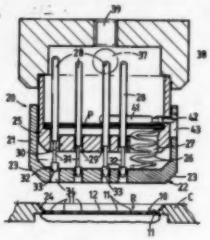
U.S. Cl. 439—660 **7 Claims**

1. A connecting device for the connection of first and second electrical of electronic circuits, said device comprising

a planar contact surface formed by a plurality of annular conductive zones disposed concentrically about an axis vertical to said planar surface, each conductive zone being isolated from the others and connected to said first circuit;

a contactor device having a plurality of separate spaced apart contacts each connected to said second circuit and each being for conductive engagement with a particular annular conductive zone said contactor device having a housing and a plunger slidingly located therein, said contacts being carried by said plunger and being projectable from said housing responsive to sliding movement of said plunger; and

locating means for automatically positioning, when a leading portion of said contactor device is positioned over said planar contact surface, each contact for engagement with



its said particular annular conductive zone irrespective of the angular positioning of the leading portion of the contactor device relative to the contact surface such that with all contacts engaged with the contact surface said first and second circuits are electrically coupled.

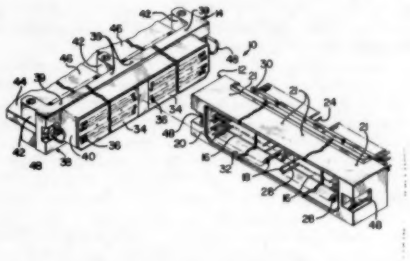
4,715,829
HIGH DENSITY ELECTRICAL CONNECTOR SYSTEM

George Preputnick, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Nov. 13, 1986, Ser. No. 930,587

Int. Cl.[4] H01R *13/04*

U.S. Cl. 439—660 **8 Claims**



1. A high density electrical connector system for electrically interconnecting circuits on printed circuit devices such as backplane, mother boards. daughter cards and the like, said system comprising:

first connector means having dielectric module means housed in shell means and a plurality of conductive pin members contained in said module means with first and second ends thereof extending outwardly from opposite sides of said module means with said first ends adapted to engage circuits on a printed circuit device;

second connector means having dielectric module means with a plurality conductive contact elements contained therein, said elements having receptacle means at one end for receiving said second ends of said pin members and outwardly extending cantilever beam means at another end for electrically engaging circuits on another printed circuit device so that the two devices may be electrically interconnected;

shell means housing said module means of said second connector means, said shell means having a pair of spaced apart ears for receiving a heat sink; and

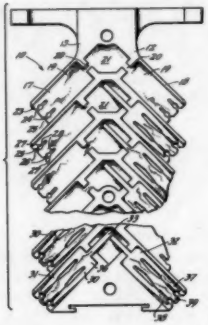
pins, received in each of said pairs of ears, extending through and supporting the heat sink.

4,715,830

WIRE STRAIN RELIEF AND CONDUCTOR RETAINER CONSTRUCTION FOR TELEPHONE BLOCKS

Paul V. De Luca, Plandome Manor, N.Y., assignor to Porta Systems Corp., Syosset, N.Y.

Filed Oct. 27, 1986, Ser. No. 923,178
Int. Cl.[4] H01R 9/24
U.S. Cl. 439—709 1 Claim



1. In a telephone connector block for interconnecting individual subscriber pairs to central office equipment, including at least one generally planar contact holding element, a plurality of contact elements supported upon said contact holding element, said contact holding element having a longitudinal axis and first and second surfaces, one of said surfaces having a plurality of laterally extending recesses, said contact elements each being positioned within a corresponding recess, each of said contact elements having a conductor retaining slot extending from an edge thereof which defines a quick clip type of connector, the improvement comprising: said contact holding elements enclosing substantially the entire length of said contact elements, and having openings therein corresponding to the conductor retaining slots in said quick clip terminals, said openings including a first end portion of width corresponding to an insulated conductor, a second portion of relatively narrower width, a third portion of generally arcuate configuration and of diameter corresponding to the width of said first portion, and a fourth portion of narrower width corresponding to the width of said second portion, said contact elements being positioned in said recesses such that said edge is positioned adjacent the junction of said third and forth portions of said openings and said retaining slot overlies and extends along the length of said forth portion, said third portion forming a recess for resiliently retaining the end of a conductor in abutted relation relative to the open end of said conductor retaining slot of said quick clip connector; whereby upon assembly of plural subscriber pair conductors within said block, and prior to engagement with a given clip connector, the ends of said conductor may be positioned and resiliently maintained at the end of a corresponding slot for engagement by a tool serving to engage said conductor within said slot.

4,715,831

WIRING FOR REFRIGERATION APPARATUS

Stephen W. Paddock, Knight Township, Vanderburg County, Ind., assignor to Whirlpool Corporation, Benton Harbor, Mich.

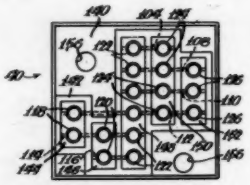
Filed Oct. 22, 1982, Ser. No. 435,895
Int. Cl.[4] H01R 9/24
U.S. Cl. 439—709 4 Claims

1. In a refrigeration apparatus arranged for operation from an electrical power source and having a plurality of electrical components including a compressor, a fan, a thermostat, and a light, and wherein one or more electrical leads are connected to each of said components, the combination of:

a plurality of electrical connectors, each of said connectors receiving at least two of selected ones of said leads and being elongated, receiving the associated leads in a single straight row;

a terminal block defining a plurality of side-by-side, connector-receiving connection stations, each of said stations being elongated and configured to receive a corresponding connector;

means disposed at each connection station and carried by each connector for establishing an electrical connection when a connector is received by the associated station; and



a plurality of electrically separated busses carried by said terminal block and extending linearly between the connecting stations to effect electrical interconnection between preselected leads associated with different ones of said connectors;

said busses being generally parallel to each other and extending generally transversely to the direction of elongation of said connection stations;

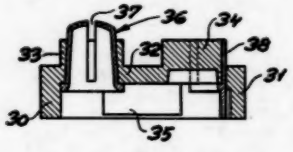
the bus effecting the greatest number of electrical connections being located centrally of the remaining busses.

4,715,832

CURRENT-CARRYING ELEMENT

Erik Bach, Billund, Denmark, assignor to Interlego A.G., Baar, Switzerland

PCT No. PCT/DK85/00074, § 371 Date May 1, 1986, § 102(e) Date May 1, 1986, PCT Pub. No. WO86/01343, PCT Pub. Date Feb. 27, 1986
PCT Filed Aug. 2, 1985, Ser. No. 852,664
Claims priority, application Denmark, Aug. 3, 1984, 3768/84
Int. Cl.[4] H01R 11/09
U.S. Cl. 439—723 11 Claims



1. A building element for a building set, said element being mechanically interconnectable with other similar elements in a number of different positions, each element comprising a plurality of contiguous, square module units having a common module measure, at least some of said units have a coupling stud protruding co-axially with a central axis of the module unit, so that the mutual centre-to-centre distance of the coupling studs is equal to a multiple of the module measure, said element moreover comprising complementary coupling means for cooperation with coupling studs on an adjacent element for mechanical intercoupling of the elements, and having at least two mutually electrically insulated current paths arranged so that when interconnected with an adjacent element a first current path is connected to first contact areas in the element to establish electrical connection with a corresponding first current path in the adjacent element, and a second current path

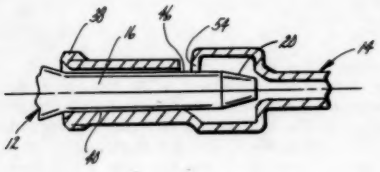
being connected to second contact areas in the element to establish electrical connection with a corresponding second current path in the adjacent element, characterized in that the portions of the first current path contact areas designed to cooperate with an adjacent element are positioned within a plurality of areas co-axial with respective central axes and of a predetermined extent which is smaller than the cross section of the coupling studs, and that the second current path contact areas are positioned co-axially around the respective central axes, but outside the first current path contact areas.

4,715,833

PIN AND SOCKET ELECTRICAL TERMINAL

Dewey F. Mobley, Lake Orion, and Janice M. Warren, New Hudson, both of Mich., assignors to Interlock Corporation, Westland, Mich.

Filed Jul. 2, 1986, Ser. No. 881,413
Int. Cl.[4] H01R *13/11*
U.S. Cl. 439—834 **9 Claims**



1. A pin and socket assembly for establishing electrical contact comprising a pin member and a hollow socket member of a size and shape to enable insertion of said pin member into said socket member, one of said members having integral radially projecting and circumferentially spaced ribs and the other one of said members having a generally cylindrical surface engageable with said ribs, said ribbed member having a single longitudinal seam and an annular wall cross section continuous on either side of said longitudinal seam, said ribs terminating in edges located substantially on an imaginary circular path having a diameter such that when said pin member is inserted into said socket member said edges of said ribs firmly engage said cylindrical surface so as to establish electrical contact between said members.

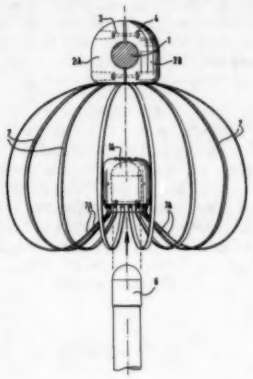
4,715,834

CONNECTOR FOR A TELESCOPIC ISOLATING SWITCH

Edmond Thuries, Meyzieu; Jean-Paul Masson, Villeurbanne, and Louis Malik, Caluire, all of France, assignors to Alsthom-Atlantique, Paris, France

Filed May 30, 1985, Ser. No. 739,587
The portion of the term of this patent subsequent to Sep. 29, 2003, has been disclaimed.
Int. Cl.[4] H01R *13/11*
U.S. Cl. 439—842 **6 Claims**

1. In a connector for electrical and mechanical connection to an overhead conductor and for constituting the female connector portion of a telescopic isolating switch suitable for cooperating electrical engagement with a male connector portion of said switch, the improvement whereby said female connector portion comprises a plurality of metal conductors which are curved and regularly circumferentially spaced in such a manner as to define meridians of a substantially spherical member, means for fixing the top ends of said conductors to a metal block, said block being electrically connected and mechanically fixed to said overhead conductor, the bottom ends of said curved metal conductors each including a rectilinear portion which is inclined relative to the vertical and extending inwardly and upwardly in such a manner as to define an inlet cone for said male connector portion, followed by a hairpin bend portion having two arms, including a radially inward one



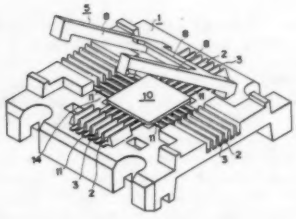
which serves as a contact finger for making electrical contact with the male connector portion.

4,715,835

IC PACKAGE CARRIER

Noriyuki Matsuoka, Tokyo, Japan, assignor to Yamaichi Electric Mfg. Co., Ltd., Tokyo, Japan

Filed Jun. 2, 1986, Ser. No. 869,605
Claims priority, application Japan, Jun. 3, 1985, 60-120000
Int. Cl.[4] H01R *9/09*; B65D *85/42*
U.S. Cl. 439—893 **2 Claims**



1. A carrier of an IC package having a plurality of IC leads projecting in parallel sidewise from at least two lateral side surfaces thereof, which comprises:

a carrier substrate including a section for accommodating the IC package therein and a plurality of grooves formed in at least two lateral side portions of the upper surface of said carrier substrate for accommodating therein the plurality of IC leads and supporting the lower surfaces of the plurality of IC leads on the bottoms thereof when the IC package has been accommodated in said section;

IC package supporting means hingedly mounted for rotation at a position on said carrier substrate, disengageably engaged at another position with said carrier substrate and comprising at least two IC lead retaining bars which extend along said two lateral side portions and engage the upper surfaces of the plurality of IC leads for retaining against the lower surfaces of the bars the upper surfaces of the plurality of IC leads when said IC package supporting means has been engaged with said carrier substrate having the IC package accommodated in said section thereof;

said at least two IC lead retaining bars having free outer ends, said free outer ends of said bars having engaging pawls, and said free outer ends being elastically shiftable toward and away from each other; and

said upper surface of said carrier substrate has engaging means for engaging said pawls and for shifting said free outer ends of said bars toward each other when said bars are rotated against the upper surface of said carrier substrate, whereby said pawls of said free outer ends are engageable and disengageable with said carrier substrate for retaining the IC package.

4,715,836

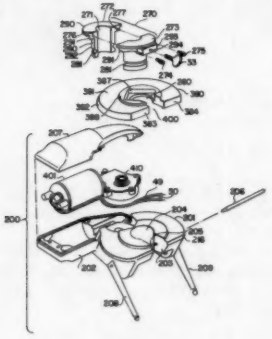
REMOTE STEERING ASSEMBLY KIT FOR OUTBOARD TROLLING MOTORS

Richard R. Schulte, 16424 S. Mayfeon, Plainfield, Ill. 60544

Continuation-in-part of Ser. No. 852,275, Apr. 15, 1986, Pat. No. 4,669,987, which is a continuation of Ser. No. 775,284, Sep. 12, 1985, abandoned, which is a continuation of Ser. No. 607,539, May 7, 1984, abandoned. This application Nov. 24, 1986, Ser. No. 934,286

Int. Cl.[4] B63H *21/17*

U.S. Cl. 440—6 **5 Claims**



1. A remote steering assembly kit for an already existing outboard trolling motor assembly of the type having a boat mounting frame member including a clamp member to clamp to a side of the boat, a sleeve member connected to said frame member, an upwardly extending cylindrical drive shaft housing extending from a drive motor at the upper end to a propeller at the bottom end received through said sleeve member and being rotatable to steer the boat on which it is mounted, said kit comprising detachable rotatable steering gear means for mounting on said cylindrical drive shaft housing of said existing outboard trolling motor assembly while it remains assembled and co-axial with said cylindrical drive shaft to rotate it in both opposite directions of rotation to thereby steer the boat, power drive gear means positioned to rotate said steering gear means in both opposite directions of rotation on command, and control means to direct said power drive gear means to rotate said steering gear means as desired in each opposite direction of rotation to steer the said boat to the right when rotated in one direction and to left when rotated in the opposite direction of rotation, said control means being movable to a location in said boat remote from said trolling motor for remote steering control of said boat, wherein said detachable rotatable steering gear means includes a steering gear member having an arcuate peripheral configuration, an arcuately extending top wall, an arcuately extending side wall having an outwardly facing surface and an inwardly facing surface, gear teeth projecting inwardly from said inwardly facing surface of said arcuately extending side wall for driving engagement with said power drive gear means, a radially extending slot in said top wall of said steering gear member opening to said side wall to receive said cylindrical drive shaft housing, a central aperture through said top wall of said steering gear member, said radially extending slot extending from said opening to said side wall to said central aperture whereby said steering gear member is mountable on said cylindrical drive shaft housing co-axially therewith while said trolling motor assembly remains assembled, rotary drive means detachably affixed to said cylindrical drive shaft housing having first engagement means for driving engagement with said steering gear member, said top wall of said steering gear member including second engagement means for engagement with said first engagement means of said rotary drive means.

4,715,837

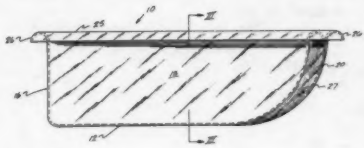
UNDERWATER VIEWING DEVICE

John F. Floyd, 858 Glenalyn Ave., Spartanburg, S.C. 29302

Continuation of Ser. No. 690,869, Jan. 14, 1985, abandoned. This application Aug. 1, 1986, Ser. No. 891,418

Int. Cl.[4] G02B *5/00*

U.S. Cl. 441—135 **4 Claims**



1. An underwater viewing device comprising:

a body, said body comprising a flat transparent bottom having a generally elongated rectangular shape with a pointed end, walls of unitary construction with said bottom and extending upwardly therefrom for a distance adequate to preclude substantial water splash thereover during normal use, said walls having means for reducing passage of light therethrough, said walls at said pointed end of said bottom defining a bow shape thereat, and an outwardly turned flange of unitary construction with said walls, said flange extending around at least a major portion of the periphery of said body near the top of said walls and permitting said device to be held by one in a moving boat and suspended in the water whereby one may view beneath the surface of the water through the transparent bottom; said bow shape defining a center line extending from an inward portion of said outwardly turned flange to said pointed end of said bottom, said center line being the most forwardly extending portion of said bow shape, said walls defining said bow shape defining a pair of surfaces to each side of said center line and extending continuously from said inner portion of said outwardly turned flange to said bottom;

said flange defining support receiving openings therein, so that said device may be secured to a boat mounted support device;

a generally C-shaped rigid support device having one end secured to one of said receiving openings in said flange; and

a bracket mounted on a side of a boat and securing said other end of said support device thereto.

4,715,838

APPARATUS FOR RECOVERING FLUORESCENT MATERIAL FROM MERCURY VAPOR DISCHARGE LAMPS

Hans Kulander, Oskarshamn, Sweden, assignor to MRT System Aktiebolag, Oskarshamn, Sweden

Filed Apr. 17, 1986, Ser. No. 853,127

Claims priority, application Sweden, Apr. 30, 1985, 8502103

Int. Cl.[4] H01J *9/00*; A47L *7/00*

U.S. Cl. 445—61 **11 Claims**

1. Apparatus for removing and collecting luminescent material from mercury vapour electrical discharge lamps and like lamps, comprising:

a stripping device (27) for loosening luminescent material

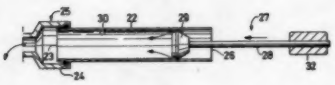
(30) from inner wall surfaces of a bulb part (22) in conjunction with a suction force; and

a suction device (25) including means connectable to one end of the bulb part (22) for generating said suction force in the bulb part and for collecting loosened luminescent material;

said stripping device (25) including:

a supporting rod (28) arranged for reciprocatory movement in the bulb part (22);

a stripping head (29) mounted on one end of said rod (28) and arranged for reciprocatory movement in the bulb part (22) along with said rod (28);



said stripping head (29) being supported and guided by said rod (28) in the bulb part (22), and being dimensional so as to define an annular air gap (36) between the outer periphery of said stripping head (29) and an opposing wall section of the bulb part (22), the size of said gap being such as to provide said suction force; and

said stripping head (29) having a double-cone configuration presenting two conical surfaces (33, 34) each departing in opposite directions from a mutually common waist section (35), said conical surfaces having given cone angles so as to center said stripping head (29) in the bulb part (22) under the influence of said suction force.

4,715,839

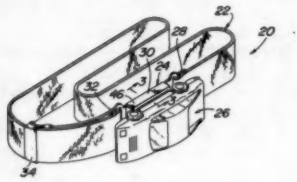
NOVELTY BELT

Allan L. Ford, Philadelphia, and Jay H. Baronoff, Yardley, both of Pa., assignors to Reborn Products Co., Inc., Bensalem, Pa.

Continuation of Ser. No. 757,593, Jul. 22, 1985, abandoned. This application Oct. 1, 1986, Ser. No. 915,912

Int. Cl.[4] A63H *33/00*

U.S. Cl. 446—28 **8 Claims**



1. A novelty item in the form of a combination belt and toy, said novelty item comprising a toy and band of material having a pair of ends and adapted to encircle the waist of a wearer to form said belt for supporting a garment thereon, buckle means secured to said band for releasably securing the ends of said band together, said buckle means including a first portion attached to one of said pair of ends of the band of material and a second portion for mating with said first portion attached to the other of said pair of ends of the band of material, said first portion overlying said second portion when said first and second portions are mated, said first portion having an outer surface and peripheral sidewalls, said toy including a lower surface and wheel means adjacent the periphery of said lower surface and extending below said lower surfae, said toy having means on its lower surface for releasably securing it onto said outer surface of said first portion against accidental disconnection therefrom, said toy completely covering the buckle means with the wheel means of said toy being outside the pheriphery of the sidewalls of said first portion of said buckle means when the toy is releasably secured to said buckle means, whereupon once the toy is so secured, it forms decorative ornamentation covering said buckle means, whereas said toy is removed from said surface, it can function as a toy or amusement device while leaving the belt still useful to support said garment.

4,715,840

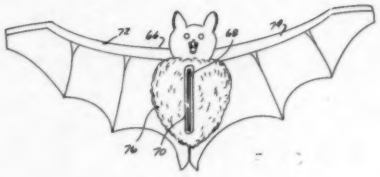
EXPANSIBLE OBJECT

Jeffery G. Swift, 5418 Nicole, Milford, Mich. 48082

Filed Aug. 1, 1986, Ser. No. 892,031

Int. Cl.[4] A63H *3/00*

U.S. Cl. 446—74 **15 Claims**



1. An expansible object comprising:

a body, simulating an animate object, the body having an access port communicating with an internal pouch, the internal pouch extending substantially over the width and length of the inside of the body;

a plurality of small objects, each simulating a smaller form of the body, storable within the internal pouch of the body; and

means for closing the access port to retain the plurality of small objects within the internal pouch.

4,715,841

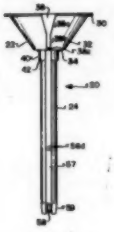
BALLOON HOLDER

David C. Nelson; Michael J. Fresh, both of Copley, Ohio, and Herbert Mueller, Herznach, Switzerland, assignors to Ballon-Mueller AG, Herznach, Switzerland

Filed Mar. 11, 1986, Ser. No. 838,516

Int. Cl.[4] A63H *3/06*

U.S. Cl. 446—222 **13 Claims**



1. A one-piece balloon holding device comprising a cup having a rim and a sidewall, and a longitudinally extending stem joined at one end to the outside of said cup at a locating remote from said rim;

said cup also having a longitudinally extending slit for insertion of the neck of the balloon;

said stem being adapted to be inserted into one end of a hollow balloon stick and being shaped so as to provide space for concealing said neck of said balloon inside said

balloon stick when the stem is so inserted, said stem having means near the end remote from said cup for engaging said neck.

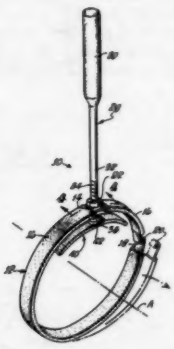
4,715,842
DOLL CONSTRUCTION
Edward C. Noble, 700 Hicks Ave., Jackson, Ala. 36545
Filed Aug. 21, 1986, Ser. No. 898,516
Int. Cl.[4] A63H *33/32*; G09B *19/00*
U.S. Cl. 446—268 **3 Claims**

1. A doll construction which comprises: an inanimate article in the form of a small figure in the general shape of a human with two arms, each arm having a hand with a plurality of fingers and a thumb joined thereto; and a fingerprint on each of the fingers and thumbs of said doll, each of said fingerprints being located in the fingerprint position at the outer end of said finger or thumb on the palm side of the hand, and with each fingerprint being in the form of a symbol such as a letter or numeral which serves to identify said doll; and a record keeping sheet having marked spaces for entering fingerprint information for each finger and thumb of the doll, thus identifying and distinguishing the doll from other similar dolls.

4,715,843
TOY VEHICLE PLAYSET
Eric C. Ostendorff, Torrance, and James I. Tucker, Jr., Manhattan Beach, both of Calif., assignors to Mattel, Inc., Hawthorne, Calif.
Filed Sep. 20, 1985, Ser. No. 778,573
Int. Cl.[4] A63H *18/00*
U.S. Cl. 446—429 **3 Claims**

1. A toy vehicle playset comprising a roadway; a booster for impelling a vehicle along the roadway; a ramp positioned in the roadway; means for normally arranging the ramp to direct a vehicle upward therefrom, the ramp being positioned above the roadway; pivot means supporting one end of the ramp above the roadway so that the ramp is movable in response to pressure on its underside to allow passage of a vehicle along the roadway; a catcher positioned in the roadway to catch a vehicle leaving the ramp; and a return portion of the roadway slanted to stop the vehicle and return it to the end of the roadway at which the booster is situated.

4,715,844
ALTERNATOR AND GENERATOR BELT TENSIONING DEVICE
David G. Fambrough, 13205 South Hills Dr., Reno, Nev. 89511
Filed May 1, 1986, Ser. No. 858,112
Int. Cl.[4] F16H *7/12*
U.S. Cl. 474—130 **2 Claims**



1. An apparatus for applying tension to an alternator/generator driven pulley or sprocket which includes: a flexible strip of material attachable at its ends to itself; such attachment effected by interlocking of inwardly bent first end of said strip of material with an outwardly bent second end of said strip of material, said interlocking being accomplished by bending said flexible strip ends apart from one another until said first and second bent ends are substantially aligned with one another and then said strip ends are interlocked with one another; an elongated handle threadedly affixed to said flexible strip at a point away from said first and second inwardly and outwardly bent ends of approximately 90° from said connected ends, said threaded portion of said handle being threadedly passing through a correspondingly threaded projection on said flexible strip; a swivably connected arcuate clamping member affixed to the end of said threaded handle at its extremity within a circle formed by said flexible strip after being connected to itself at its ends and capable of gripping an alternator/generator housing when said handle is rotated to move said arcuate clamping member against said housing thereby forcing said housing against said arcuate strip at a point opposite said threaded handle.

4,715,845
SPROCKET WHEEL FOR DRIVING SAW CHAIN OF CHAIN SAW
Akira Nagashima, Kawasaki, Japan, assignor to Kioritz Corporation, Tokyo, Japan
Filed Jul. 21, 1986, Ser. No. 888,451
Claims priority, application Japan, Aug. 9, 1985, 60-122504[U]
Int. Cl.[4] F16H *55/30*
U.S. Cl. 474—152 **3 Claims**

1. A sprocket wheel for driving a saw chain of a chain saw comprising

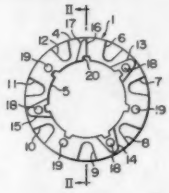
a pair of annular sprocket wheel members of the same shape and configuration each formed on one side surface thereof with elevated surface portions of a number which is one half the desired number of the teeth of the sprocket wheel produced as an end product by joining the sprocket wheel members together in such a manner that the one side surfaces thereof having the elevated surface portions face each other, wherein

each said elevated surface portion provides a respective tooth of the sprocket wheel,

said desire number of teeth is an odd number,

each said pair of sprocket wheel members is formed with a plurality of projections on first respective parts of said one side surface thereof and with a plurlity of recesses on second respective parts of said one side surface thereof,

said projections of each said sprocket wheel member are received in the respective recesses of the other when the two sprocket wheel members are joined together, and



one of said elevated surface portions on each said sprocket wheel member is a half-size elevated surface portion, and the half-size elevated surface portions of the two sprocket wheel members are joined to each other back to back when the two sprocket wheel members are joined together to provide a completed respective one of said elevated surface portions.

4,715,846

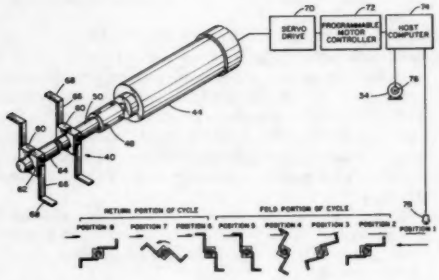
TRAILING PANEL FOLDER

Chet Zak, West Newbury, Mass., assignor to Post Machinery, Inc., Portsmouth, N.H.

Filed Jun. 11, 1986, Ser. No. 872,797

Int. Cl.[4] B31B *1/00*

U.S. Cl. 493—10 **11 Claims**



1. A trailing panel folding system for use in a blank folding machine including coveyor means driven by a drive means for continuously advancing blanks with trailing panels in a predetermined direction in untimed relationship to one another along a generally horizontal path, said trailing panel folding system comprising:

a rotatable shaft mounted below said path and transverse thereto;

a motor, which is not part of said drive means, connected to drive said shaft;

arm means mounted on said shaft and extending generally radially therefrom, said arm means having at least one arm extending away from said shaft and a folding head for folding a trailing panel of a blank at the distal end of said arm and projecting therefrom substantially normal to the axis of said shaft;

an encoder interconnected with said drive means providing a pulsed output related to the velocity at which said blanks are moving along said path;

a blank sensor responsive to the presence of a blank at a predetermined location along said path upstream of said shaft for providing a trailing edge signal when the trailing edge of the sensed blank leaves said location;

a programmable motor controller for operating said motor through a cycle of operation, said controller including means for moving said arm means to a predetermined start position wherein said folding head is disposed upstream of said shaft, means for causing said folding head to move to an up position wherein said folding head overlies the folded trailing panel at a speed sufficiently fast to overtake and fold the panel, means to cause said folding head to dwell in said up position, and means for causing said arm means to move to a start position after the folded panel has moved from under said folding head; and

a microprocessor interconnected with said encoder, said blank sensor and said controller for receiving input signals based upon the operation of said sensor and said encoder, and providing output signals to said controller to start said cycle and to cause said head to move from said up position, wherein said means for causing said folding head to move to an up position causes said motor to operate in accordance with a first acceleration/velocity profile, and wherein said means for causing said arm means to move to a start position causes said motor to operate in accordance with a second acceleration/velocity profile, said first and second profiles being different.

4,715,847

PROCESS AND APPARATUS FOR PRODUCING BLANKS FOR PACKS

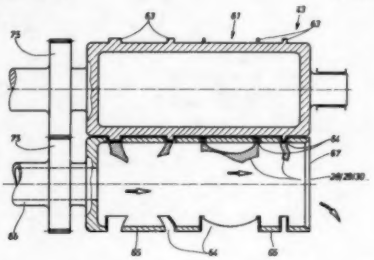
Heinz Focke, and Jürgen Focke, both of Verden, Fed. Rep. of Germany, assignors to Focke & Co., Verden, Fed. Rep. of Germany

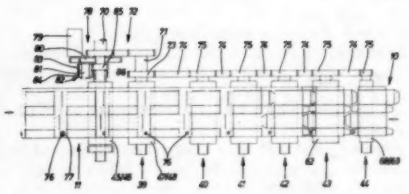
Filed Jan. 3, 1986, Ser. No. 816,018

Claims priority, application Fed. Rep. of Germany, Jan. 10, 1985, 3500547

Int. Cl.[4] B31B *1/00*

U.S. Cl. 493—11 **16 Claims**





1. Process for producing blanks for packs, made of paper, cardboard or like packaging material, by severing them from a longitudinal sheet of packaging material, wherein the blanks are severed from the sheet during conveying of the latter, wherein the sheet is normally conveyed at a constant speed, and wherein each pack has two rectangular main wall panels,

(12, 13), two rectangular side wall panels (14, 15), and two rectangular end closures (20), said process characterized by:

severing each blank (10) from the sheet (11) in a plurality of partial cuts which form, from laterally aligned portions of the sheet (11), a pair of closing tabs (19) respectively provided on parts of the sheet (11) forming main wall panels (13, 12) at the trailing and leading edges of successive blanks (10), and each of which comprises one of said end closures and a closing tongue (21), two side tabs (17), respectively provided on parts of the sheet (11) forming side wall panels (14) at the trailing and leading edges of successive blanks (10), between said pair of closing tabs (19), and two side tabs (18), respectively provided on parts of the sheet (11) forming side wall panels (15) at the trailing and leading edges of successive blanks (10), laterally adjacent one of said pair of closing tabs (19), such that the side tabs (17, 18) are laterally narrower than said parts of the sheet (11) forming the side wall panels (14 and 15) on which said side tabs (17, 18) are provided, at least at parts of the side tabs (17, 18) spaced from said parts of the sheet (11) forming the side wall portions (14, 15) on which the side tabs (17, 18) are provided, and gaps are formed between each of the pair of closing tabs (19) and each laterally adjacent side tab (17, 18); and

executing said partial cuts in at least two work cycles in which partial cuts are made respectively along opposite sides of said gaps.

4,715,848

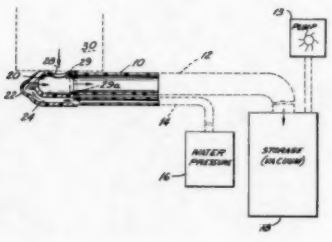
GASTRO-INTESTINAL LAVAGE SYSTEM AND METHOD

Gregory A. Beroza, 16 Dikeman St., Hempstead, N.Y. 11550

Continuation of Ser. No. 723,557, Apr. 15, 1985, abandoned. This application Dec. 16, 1986, Ser. No. 942,258

Int. Cl.[4] A61M *1/00*

U.S. Cl. 604—35 **5 Claims**



1. A gastric lavage device comprising:

a nozzle;

an aspirating chamber in said nozzle;

a window in a side of said aspirating chamber, effective for communicating with a body cavity;

an exit port in a rear portion of said nozzle;

an opening in a forward end of said aspirating chamber, said opening being directed toward said exit port from front to rear across said aspirating chamber;

means for connecting a source of pressurized liquid to said opening;

said opening and said source of pressurized liquid being effective in combination to direct a hard stream of said liquid through said aspirating chamber toward said exit port, whereby debris in said aspirating chamber is broken up and urged toward said exit port;

means for creating a reduced pressure at said exit port, whereby debris in said body cavity may be drawn through said window into said aspiration chamber, therein to be broken up by said hard stream of liquid and removed through said exit port.

4,715,849

METHOD FOR EASILY DRAWING BLOOD FROM ARM OR LEG

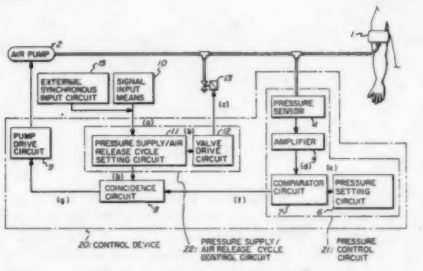
Hidenori Gion; Takumi Yoda, both of Okayama; Yasuzo Kirita, Toyonaka; Kazuhito Zaima, Saijo, and Noriyuki Kurata, Takamatsu, all of Japan, assignors to Kuraray Co., Ltd., Kurashiki, Japan

Filed Feb. 21, 1986, Ser. No. 832,524

Claims priority, application Japan, Feb. 26, 1985, 60-38563

Int. Cl.[4] A61B *17/12*

U.S. Cl. 604—52 **3 Claims**



1. A method from drawing blood from an arm or leg of a patient which comprises:

inserting a blood-drawing needle into a vein in the arm or leg of a patient,

winding a bag-like band around the patient's arm or leg, at a site downstream of the point of insertion of the blood-drawing needle, so as to increase the amount of blood drawn by said blood-drawing needle,

inflating said bag-like band with air from a pneumatic pump so that said bag-like band presses tightly against the patient's arm or leg, and

controlling the inflation of said bag-like band by:

generating a periodic signal of 3–10 second duration which activates the closing of valve means concurrently with generating a first drive signal, followed by a 1–3 second period when neither signal is generated,

monitoring the pressure is said bag-like band, such that a second drive signal is generated whenever the pressure is less than a reference value which is equal to 30–150 mm Hg, and

monitoring said first and second drive signals such that a pump driving signal is generated activating said pneumatic pump only when said first and second drive signals are generated.

4,715,850

THERAPEUTIC AGENT DELIVERY SYSTEM AND METHOD

Loi H. Tran, Wheaton, Ill., assignor to Controlled Release Technologies, Inc., Batavia, Ill.

Filed Dec. 6, 1984, Ser. No. 679,128

Int. Cl.[4] A61M *31/00*

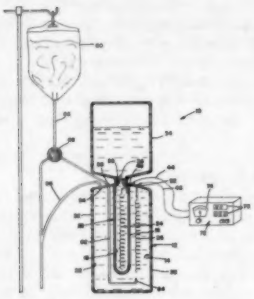
U.S. Cl. 604—82 **27 Claims**

1. A therapeutic agent delivery system comprising:

housing means defining a cavity divided by a semipermeable membrane into a donor chamber of substantially constant volume adapted to hold the therapeutic agent and a receiving chamber adapted to receive the therapeutic agent from the donor chamber through the membrane;

an anode and a cathode in communication with the cavity with at least one of the anode and cathode being in communication with the donor chamber such that the therapeutic agent remains in the donor chamber until an electromotive force of a sufficient amount is applied between the anode and cathode whereby at least a portion of the

therapeutic agent passes from the donor chamber to the receiving chamber; and



delivery means for delivering the therapeuric agent from the receiving chamber to a patient.

4,715,851

MEANS FOR HANDLING TWO SOLUTIONS WHICH ARE TO BE MIXED TOGETHER

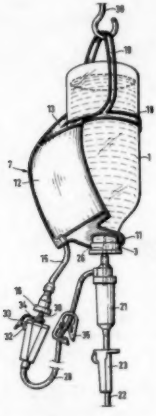
Peter Geisser, St. Gallen; Hans P. Kaiser, Zurich, and Franz Berger, Gossau, all of Switzerland, assignors to Laboratorien Hausmann AG, St. Gallen, Switzerland

Filed Jun. 11, 1986, Ser. No. 872,863

Claims priority, application Fed. Rep. of Germany, Jun. 25, 1985, 3522645

Int. Cl.[4] A61M *37/00, 5/14*

U.S. Cl. 604—82 **13 Claims**



1. An apparatus for handling and mixing together two liquids in a sterile manner comprising:

a rigid container for housing a first fluid including a first closure disposed at one end of said rigid container;

a flexible bag mounted to said rigid container for housing a second fluid, including a tube with a second closure mounted at one end of said tube;

a first needle inserted into said first closure;

a drop chamber fluidly connected to said first needle;

an infusion tube fluidly connected to said drop chamber;

a first flow regulation means disposed along said infusion tube for controlling the rate of fluid flow through said infusion tube;

a second needle inserted into said second closure;

an air inlet filter fluidly connected to said second needle;

a connecting tube fluidly connecting said air inlet filter with said drop chamber;

a second flow regulation means for controlling the flow of said second fluid into said drop chamber,

whereby insertion of said first and second needles in said first and second closures permits flow of the said first and second fluids to said drop chamber for mixing therein.

4,715,852

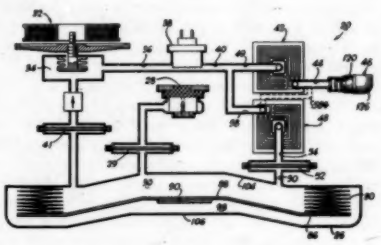
IMPLANTED MEDICATION INFUSION DEVICE

Robert H. Reinicke, Mission Viejo, and Lance M. Yamato, Rancho Palos Verdes, both of Calif., assignors to Eaton Corporation, Cleveland, Ohio

Filed Jul. 21, 1986, Ser. No. 888,585

Int. Cl.[4] A61M *7/00*

U.S. Cl. 604—131 **20 Claims**



1. In an implantable medication infusion device, the combination of, a medication reservoir having a movable wall portion, a pressure stabilizing chamber in communication with said movable wall portion and filled with a fluid having a pressure which is greater than the pressure of the body in which said device is implanted, a solenoid operated pulsatile pumping unit having an inlet communicating with said reservoir through an inlet valve; and a flow restrictor positioned between said pumping unit and a catheter outlet, said flow restrictor permitting; and continuous flow of medication to said catheter outlet at a safe value rate in the event said inlet valve remains open.

4,715,853

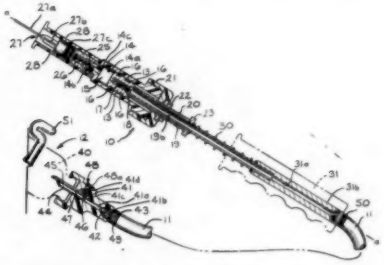
BACK-FILL SYRINGE

Gordon E. Prindle, Schaumberg, Ill., assignor to Ideal Instruments, Inc., Chicago, Ill.

Filed Sep. 19, 1986, Ser. No. 909,481

Int. Cl.[4] A61M *5/18*

U.S. Cl. 604—184 **16 Claims**



1. A syringe assembly and dispensing bottle means which reloads a liquid to be dispensed by the syringe assembly after injecting a dose of the liquid into an animal which comprises:

(a) a piston means movable along a longitudinal axis for

dispensing the liquid from the syringe assembly and which has an opening along the axis;

(b) a sleeve means confining the piston means for movement along the longitudinal axis and defining a chamber with the piston means for holding the liquid prior to dispensing, the sleeve means having a dispensing end with an opening for discharging the liquid through a needle means mounted on the dispensing end and a charging end for receiving the liquid;

(c) tubular means connected at one end to the piston means along the longitudinal axis and extending from the charging end of the sleeve means to provide movement of the piston means in the sleeve means and to provide a fluid connection from the dispensing bottle means to the opening in the piston means;

(d) handle means grippable by one hand mounted on the tubular means away from the charging end of the sleeve means such that the tubular means can be moved to push the piston means in the sleeve means along the longitudinal axis by the hand on the handle means;

(e) hose means connected to the tubular means at an end opposite the one end of the tubular means;

(f) bottle means connected to the hose means;

(g) one-way valve means in the dispensing end of the sleeve means, the opening in the piston means or in the tubular means and in the bottle means, whereby the liquid can be dispensed from the chamber through the dispensing end of the sleeve means and needle means by the piston means with the valve means in the dispensing end open and with the valve means in the tubular means or piston means and the bottle means closed when the needle means is inserted into the animal and the fluid injected by pushing the handle means along the longitudinal axis and whereby the chamber is refilled from the bottle means by closing the valve means in the dispensing end and by opening the valve means in the piston means and in the bottle;

(h) return means mounted on the assembly so as to move the piston means in the sleeve means back to the position for holding the liquid prior to dispensing and thus to refill the chamber; and

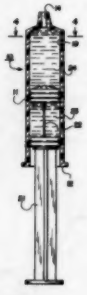
(i) additional one-way valve means for air inlet into the bottle means which allows air to enter the bottle means as the chamber in the sleeve means is refilled by movement of the piston means in the sleeve means back to the position for holding the liquid prior to dispensing.

4,715,854

MULTIDOSE DISPOSABLE SYRINGE AND METHOD OF FILLING SAME

Vincent L. Vaillancourt, 30A Ridgedale Ave., East Hanover, N.Y. 07936

Filed Jul. 17, 1986, Ser. No. 887,078
Int. Cl.[4] A61M *5/00*
U.S. Cl. 604—191 **9 Claims**



1. A multidose syringe comprising

a one piece cylindrical barrel having an open end and a tip defining a closed end with a duct extending therefrom;

a first piston mounted in said barrel in friction-fit relation to move from a first position abutting said closed end to a second position spaced therefrom to define a first chamber therebetween for receiving a first fluid;

a second piston slidably mounted in said barrel in friction-fit relation to move between a first position adjacent said first piston and a second position spaced therefrom to define a second chamber therebetween for receiving a second fluid;

a piston rod connected to said second piston and extending from said barrel;

collapsible means connecting said pistons to move said first piston with said second piston after predetermined movement of said second piston from said first piston after filling of said second chamber with a fluid;

a passageway disposed between said first piston and said barrel defining a communicating path between said duct and a point between said pistons with said first piston in said first position thereof; and

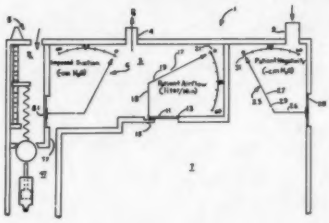
means in said passageway to create turbulence in a flow of fluid drawn into said second chamber to preclude an air flow into said second chamber.

4,715,855

DRY BOTTLE DRAINAGE SYSTEM

Nicholas F. D'Antonio, and Nicholas J. D'Antonio, both of Liverpool, N.Y., assignors to Pfizer Hospital Products Group, Inc., New York, N.Y.

Filed Aug. 20, 1984, Ser. No. 642,564
Int. Cl.[4] A61M *1/00*
U.S. Cl. 604—320 **10 Claims**



4. A system for draining fluids from a portion of the body, said system comprising:

collection means for receiving fluids from the body, said collection means including an inlet port for admitting fluids from the body to said collection means;

a suction chamber communicatable with said collection means, said suction chamber being connectable to a suction source;

a suction regulator for controlling the pressure in said suction chamber, said suction regulator including

a first compartment having a first chamber communicating with the atmosphere;

a second compartment having a second chamber communicating with said suction chamber;

first dividing means dividing said first chamber from said second chamber, said first dividing means including an opening for putting said second chamber in communication with said first chamber;

first closing means movable between an opening position for opening said opening and a closing position for closing said opening; and

biasing means for biasing said closing means towards the closed position with a force which establishes a force equilibrium across said closing means when the force resulting from the application of the desired pressure to said closing means occurs;

venturi means for admitting gases from said collection chamber into said suction chamber rate a flow rate according to the pressure differential between said collection chamber and said suction chamber; and

gas flow measuring means for measuring the gas flow rate through said venture means.

4,715,856

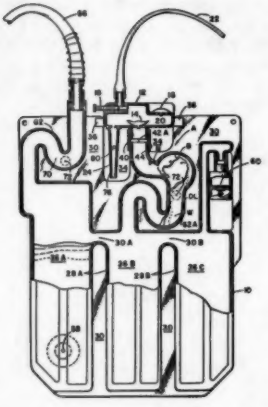
AIR LEAK DETECTION SYSTEM FOR CHEST FLUID COLLECTION BOTTLES AND BLOW-OUT PREVENTION BAFFLE THEREFOR

Donald P. Elliott, Denver, and William L. Halseth, Parker, both of Colo., assignors to C. R. Bard, Inc., Murray Hill, N.J.

Continuation of Ser. No. 381,161, May 24, 1982, Pat. No. 4,544,370. This application Aug. 13, 1985, Ser. No. 765,315

Int. Cl.[4] A61M *1/00*

U.S. Cl. 604—321 5 Claims



1. An apparatus for draining a patient's chest cavity comprising a body including a closed collection chamber having an inlet at the upper end thereof for connection to a patient drainage tube permitting chest cavity fluid and air to drain directly through said inlet to provide direct unobstructed flow of air and fluid into said collection chamber, an air space above the collection chamber, an outlet from the collection chamber in communication with the air space, said body further including a combination negative pressure indicator and air leak detector assembly in turn including a reservoir positioned downstream of said collection chamber and having a liquid trap portion for receipt of an indicator fluid, said reservoir connected to said collection chamber by an upright column positioned intermediate said collection chamber and said reservoir and in turn connected to said outlet at the upper end thereof and to said liquid trap portion at the lower end thereof, and one-way valve seal downstream of the negative pressure indicator and air leak detector assembly acting as a seal to prevent air from entering back into the air leak detector but permitting air from the air leak detector to flow out the valve seal.

4,715,857

WOUND DRESSINGS

Laszlo Juhasz, London, and Angus I. McLeod, Bucks, both of England, assignors to Charcoal Cloth Ltd., Berkshire, England

PCT No. PCT/GB86/00217, § 371 Date Nov. 12, 1986, § 102(e) Date Nov. 12, 1986, PCT Pub. No. WO86/05970, PCT Pub. Date Oct. 23, 1986

PCT Filed Apr. 18, 1986, Ser. No. 882,915

Claims priority, application United Kingdom, Apr. 18, 1985, 8509977

Int. Cl.[4] A61F *13/16*

U.S. Cl. 604—359 18 Claims

1. An anti-bacterial wound dressing comprising:

a first layer of permeable material,

a layer of semi-permeable adhesive material,

a layer of charcoal fabric,

a second layer of permeable material,

said first and second permeable layers and said semi-permeable layer being coextensive and surrounding said charcoal fabric, said first permeable layer being bound to said charcoal fabric layer and to said second permeable layer adjacent the periphery of said charcoal fabric layer.

4,715,858

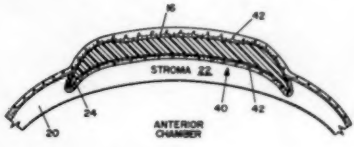
EPICORNEAL LENS

Richard L. Lindstrom, 1065 W. Ferndale Rd., Wayzata, Minn. 55391

Filed Jul. 25, 1986, Ser. No. 889,174

Int. Cl.[4] A61F *2/14*

U.S. Cl. 623—5 13 Claims



10. Epicorneal lens comprising:

a. lens optic means having upper and lower surfaces for implant in an eye between a stroma and epithilium of the eye;

b. said lens optic means of a synthetic biocompatible material; and,

c. a basement membrane material completely coating at least one of said surfaces of said lens optic means with a material for enhancing epithelium growth.

4,715,859

HIP CUP FOR A HIP JOINT ACETABULAR PROSTHESIS

Klaus-Dieter Schelhas, Bremen, and Gerd Biehl, Cologne, both of Fed. Rep. of Germany, assignors to Orthoplant Endoprothetik GmbH, Bremen, Fed. Rep. of Germany

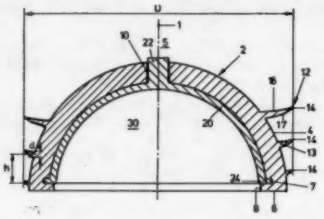
Filed Dec. 4, 1986, Ser. No. 937,877

Int. Cl.[4] A61F *2/34*

U.S. Cl. 623—22 10 Claims

1. Hip joint acetabular prosthesis cup comprising an outer cup having a truncated cone external form having a crown at one end and an annular cup edge at the other end, with an inner cup capable of being inserted to the outer cup, and with a self-cutting thread running about externally on the outer shell

for cementless anchoring of the cup in the bony tissue, and wherein the external diameter (D) of the thread is approxi-



mately constant over the entire cup and wherein the thread has a decreasing depth as it approaches said annular cup edge.

4,715,860

POROUS ACETABULAR HIP RESURFACING

Harlan C. Amstutz, Pacific Palisades, and J. Michael Kabo, Los Angeles, both of Calif., assignors to The Regents of the University of California, Berkeley, Calif.

Filed Aug. 23, 1985, Ser. No. 768,871

Int. Cl.[4] A61F 2/34

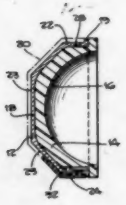
U.S. Cl. 623—22 **17 Claims**

1. An acetabular component for an artificial hip joint comprising:

a continuous metal cup having a rim, said cup having a diameter of between about four and seven centimeters, said cup having an outer coating of a porous metallic material having an affinity for bone ingrowth, the outer periphery of said cup extending from the rim thereof having a aright cylindrical configuration extending from the rim thereof having a right cylindrical configuration extending for at least one-half centimeter away from the rim thereof;

a hollow plastic insert including means for firmly securing said insert into said metal cup after said cup is in place in the patient, said plastic insert having a central opening having a substantially spherical surface for receiving the ball of the femoral component of the artificial hip joint;

said cylindrical surface of said cup extending for the greater portion of the periphery of said cup, said cylindrical surface extending for in the order of one-half or less of the total depth of said prostheses, and then being directed



inwardly toward the bottom of said plastic insert and generally following the configuration of said spherical surface to minimize the necessary bone removal and to avoid penetration of the acetabulum; and

said cup being free of outwardly directed elements which might otherwise interfere with full press-fit seating of said cup;

whereby a force fit of the right cylindrical surface of the acetabular component encourages early bone growth into the porous outer coating thereof, and increased permanency of the artificial joint.

4,715,861

ECONOMY CHROME TANNING PROCESS WITH ALDEHYDE-ACIDS AND KETO-ACIDS

Werner Lotz, Niedernhausen; Karlheinz Fuchs, Hünfelden, and Siegmund Haller, Kelkheim, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed May 8, 1986, Ser. No. 861,100

Claims priority, application Fed. Rep. of Germany, May 10, 1985, 3516842

Int. Cl.[4] C14C *1/00*

U.S. Cl. 8—94.18 5 Claims

1. An economy chrome tanning process, which comprises pretreating the pelts before tanning with 0.1 to 2% of an aldehyde-acid or keto-acid and subsequently tanning the pretreated pelts.

4,715,862

WASH CYCLE FABRIC CONDITIONING COMPOSITION, PROCESS FOR MANUFACTURE OF SUCH COMPOSITION, AND METHOD OF USE THEREOF

Robert J. Steltenkamp, Somerset, and Michael A. Camara, Jackson, both of N.J., assignors to Colgate-Palmolive Company, New York, N.Y.

Continuation-in-part of Ser. No. 716,871, Mar. 27, 1985, Pat. No. 4,682,982. This application Dec. 8, 1986, Ser. No. 939,653

The portion of the term of this patent subsequent to Jul. 28, 2004, has been disclaimed.

Int. Cl.[4] D06M *13/40*

U.S. Cl. 8—137 12 Claims

1. A wash cycle fabric conditioning composition which comprises an antistatic proportion, sufficient to impart antistatic characteristics to laundry during washing when the fabric conditioning composition is charged to wash water during the wash cycle at a concentration of 0.2 to 2 g./l., of antistatic N-higher alkyl neoalkanamide or antistatic N-higher alkenyl neoalkanamide or a mixture thereof, wherein the higher alkyl or higher alkenyl is of a number of carbon atoms in the range of 8 to 20 and the neoalkanoic acid moiety is of 5 to 16 carbon atoms, and a particulate carrier or liquid medium for the amide which is a builder or filler suitable for building a detergent or filling it, or is an aqueous medium containing a nonionic surface active agent.

4,715,863

PROCESS FOR DYEING HYDROPHOBIC FIBRE MATERIAL FROM AQUEOUS BATH CONTAINING UNTREATED DISPERSE DYE AND TO ADJUST THE EXHAUSTED DYE BATH FOR FURTHER USE

Josef Navratil, Basel, and Heinz Abel, Reinach, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed May 9, 1986, Ser. No. 861,676

Claims priority, application Switzerland, May 14, 1985, 2049/85

Int. Cl.[4] D06P *3/54, 5/20*

U.S. Cl. 8—440 23 Claims

1. A process for dyeing hydrophobic fibre material with unformulated disperse dyes from an aqueous liquor containing a solubilizingly or dispersingly effective amount of surfactant or surfactant mixture having a hydrotropic action on disperse dyes, which process comprises dissolving one or more such dyes in water at a temperature of 50° to 150° C. by means of said surfactant or surfactant mixture, bringing the dye solution together with the substrate in a dyeing apparatus, then heating the dyeing liquor to the dyeing temperature, completing the dyeing at that temperature, then removing the substrate, restoring the exhausted dyeing liquor to the composition required for the next dyeing by adding water and surfactant in amounts corresponding to the amounts used in the previous dyeing and the same or different dye, and dyeing further substrate.

4,715,864

LIGNOSULFONATE SALTS FOR USE AS DYESTUFF ADDITIVES

Peter Dilling, Isle of Palms, and Susan L. Schlegel, Goose Creek, both of S.C., assignors to Westvaco Corporation, New York, N.Y.

Filed May 5, 1986, Ser. No. 859,384

Int. Cl.[4] C09B *67/00*

U.S. Cl. 8—557 17 Claims

1. A method of producing a sulfonated lignin salt for use as a dispersant in azo dyestuff-containing dye systems comprising the step of modifying a sulfonated lignin salt by addition of an amine compound having a pKa value lower than the pKa value of the cation component of the sulfonated lignin salt, and combining the amine compound and sulfonated lignin salt to produce an ion exchange reaction and equilibrium therebetween.

11. A dyestuff composition containing an azo dyestuff and as a dispersant therein the ion-exchange reaction product of a sulfonated lignin salt having a relatively high pKa value and an amine compound having a pKa value lower than the pKa value of the cation component of the sulfonated lignin salt.

4,715,865

METHOD FOR CONTROLLING VISCOSITY OF ORGANIC LIQUIDS AND COMPOSITIONS

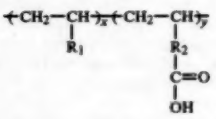
Kisuho Kitano, Ohi, Japan; Ilan Duvdevani, Leonia, and Donald N. Schulz, Annandale, both of N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Continuation-in-part of Ser. No. 625,974, Jun. 29, 1984, abandoned, which is a continuation-in-part of Ser. No. 565,106, Dec. 23, 1983, abandoned. This application Dec. 9, 1985, Ser. No. 806,416

Int. Cl.[4] C10L *7/00*

U.S. Cl. 44—7.3 5 Claims

1. A method of viscosifying an organic liquid from about 10 to about 10,000 cps for polymer concentrations of less than about 1.0 wt. % which method comprises adding a sufficient quanity of a ester containing copolymer of an alpha-olefin and a vinyl alkylenecarboxylic acid copolymerized in the presence of a Ziegler-Natta catalyst having an acid content of from about 0.01 to 10 mole percent and a molecular weight of about 100,000 to about 10,000,000, wherein said copolymer of said alpha-olefin and said vinyl alkyl-enecarboxylic acid has the formula:



wherein R_1 is an alkyl group having 6 carbon atoms, R_2 is an alkylene group having 17 carbon atoms, x is about 95.0 to about 99.95 mole % and y is about 0.05 to about 5.0. mole %.

4,715,866

DERIVATIVES OF POLYETHER GLYCOL ESTERS OF POLYCARBOXYLIC ACIDS AS RHEOLOGICAL ADDITIVES FOR COAL-WATER SLURRIES

Donald D. Staker, and William S. Kain, both of Cincinnati, Ohio, assignors to National Distillers and Chemical Corporation, New York, N.Y.

Continuation of Ser. No. 819,088, Jan. 15, 1986, abandoned. This application Apr. 30, 1987, Ser. No. 45,728

Int. Cl.[4] C10L *1/32*

U.S. Cl. 44—51 32 Claims

1. A coal-water slurry comprising coal, water and a rheological additive comprising the reaction product of a polycarboxylic organic acid having from about 16 to about 60 carbon atoms and from 2 up to 4 carboxyl groups, said polycarboxylic

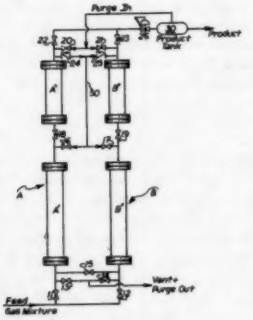
organic acid selected from the group consisting of dimer acids, trimer acids, adducts of unsaturated monocrboxylic acids or dimer acids with maleic anhydride in a molar ratio of about 1:1, adducts of linoleic acid or similar unsaturated monocarboxylic acids with acrylic-type acids in a molar ratio of about 1:1 and aducts of olefins having from about 12 to about 40 carbon atoms with maleic acid or maleic anhydride in a molar ratio of about 1:1; with (a) a polyether glycol having recurring oxyalkylene groups containing up to 4 carbon atoms and a molecular weight of from about 1,000 to about 20,000; and (b) an organic hydroxylic compound having a molecular weight of less than, 1,000 and containing one hydroxyl group; said molar ratio of (a) said polyether glycol to (b) said organic hydroxylic compound ranging from about 4:1 to about 1:4; said polycarboxylic acid having at least 55% up to essentially 100% of the available carboxylic groups reacted.

4,715,867

AUXILIARY BED PRESSURE SWING ADSORPTION MOLECULAR SIEVE

Toan P. Vo, Pittsburgh, Pa., assignor to Calgon Carbon Corporation, Pittsburgh, Pa.

Filed Apr. 4, 1986, Ser. No. 848,309
Int. Cl.[4] B01D *53/04*
U.S. Cl. 55—26 **14 Claims**



1. A process for producing an enriched gas stream substantially continuously in a system consisting of at least first and second adsorption zones each of which comprises a primary column and an auxiliary column connected in series and contains an adsorbent capable of selective adsorbing at least one component of a gaseous mixture; said process comprising the complementary steps of

(a) serially passing co-currently said gaseous mixture containing the gas to be enriched through a first adsorption zone having a primary adsorption column and an auxiliary adsorption column connected in series at an adsorption pressure of from about 1.01 to 200 bars to produce an enriched gas stream;

(b) discontinuing the flow of gaseous mixture prior to breakthrough from said first adsorption zone and immediately thereafter equalizing the pressure in said first adsorption zone with the pressure in the primary column of said second adsorption zone by substantially simultaneously

(i) equalizing the auxiliary column of said first adsorption zone from its outlet to the outlet of the primary column of said second adsorption zone, and simultaneously equalizing from the inlet of the primary column of the first adsorption zone to the inlet of the primary column of the second adsorption zone; and

(ii) pressurizing the auxiliary column of the second adsorption zone substantially to the same pressure of the primary column of said second adsorption zone with said enriched gas;

(c) venting the first adsorption zone counter-currently to atmospheric pressure;

(d) regenerating said first adsorption zone in the direction opposite to that of the gaseous mixture in step (a);

(e) pressurizing the second adsorption zone with said gaseous mixture to the adsorption pressure and producing enriched product gas from the outlet of said second adsorption zone while continuing said venting and regeneration in said first adsorption zone;

(f) discontinuing the flow of gaseous mixture prior to breakthrough from the second adsorption zone and immediately thereafter equalizing the pressure in said second adsorption zone with the pressure in the primary column of said first adsorption zone by substantially simultaneously

(i) equalizing the auxiliary column of said second adsorption zone between said outlet of said column and said outlet of the primary column of said first adsorption zone, and simultaneously equalizing from the inlet of the primary column of the second adsorption zone to the inlet of said primary column of the first adsorption zone; and

(ii) pressurizing said auxiliary column of said first adsorption zone substantially to the same pressure of the primary column of said first adsorption zone with said enriched gas;

(g) venting said second adsorption zone counter-currently to atmospheric pressure;

(h) regenerating said second adsorption zone in the direction opposite to that of the gaseous mixture in step (e);

(i) while continuing the venting and regeneration in the second adsorption zone pressurizing the first adsorption zone with said gaseous mixture to the adsorption pressure; and

(j) repeating the sequence of steps (a) through (i).

11. An auxiliary bed pressure swing gas adsorption means comprising:

(a) at least first and second adsorption means consisting of

(i) a primary adsorption column having a sorbent bed and inlet and outlet means; and

(ii) an associated auxiliary adsorption column in series with said primary adsorption column, said auxiliary column having a sorbent bed and controllable inlet and outlet means;

(b) means for selectively controlling feed gas to be separated installed at said primary column inlets;

(c) gas storage means for storing separated product gas selectably connected to said auxiliary column outlets and having first and second outlet means;

(d) first gas transfer means selectably connected to said outlets of said auxiliary column and one of said storage means outlets;

(e) second gas transfer means selectably connected to said outlets of said auxiliary columns and adapted for connection with said outlet of a primary column, said second gas transfer means including equalization means for equalizing said auxiliary column of said first adsorption means from its outlet to said outlet of said primary column of said second adsorption means simultaneously with equalizing the inlets of the primary columns of said first and second means;

(f) means for pressurizing the auxiliary column of said second adsorption means substantially simultaneously to the same pressure as the primary column of said second adsorption zone with said gas from storage means;

(g) means for equalizing the auxiliary column of said second adsorption means and the outlet of said primary column of said first adsorption means simultaneously with equalizing the inlet of said primary column of said second adsorption means to the inlet of said primary column of said first adsorption means;

(h) means for pressurizing said auxiliary column of said first adsorption means substantially simultaneously to the pres-

sure of said primary column of said first adsorption means; and

(i) means for selectively venting said first and second adsorption means.

4,715,868

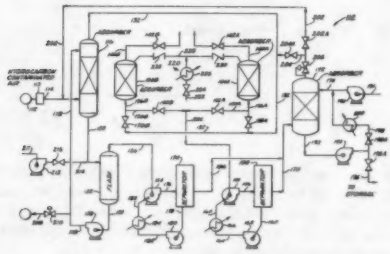
VAPOR RECOVERY SYSTEM

Paul E. Kennedy, Tulsa, Okla., assignor to McGill Incorporated, Tulsa, Okla.

Continuation-in-part of Ser. No. 751,329, Jul. 1, 1985, Pat. No. 4,670,028. This application Sep. 22, 1986, Ser. No. 909,969

Int. Cl.[4] B01D *53/14*

U.S. Cl. 55—48 23 Claims



1. In a process in which hydrocarbon components are removed from an inlet air-hydrocarbon mixture by passing the inlet air-hydrocarbon mixture through solid adsorbent beds capable of selectively adsorbing hydrocarbon components from the inlet air-hydrocarbon mixture, and in which the adsorbent beds are vacuum regenerated to produce a rich air hydrocarbon mixture which is passed to an absorber in which a substantial portion of the hydrocarbon components are absorbed from the rich air-hydrocarbon mixture by a liquid hydrocarbon absorbent to produce an absorber overhead gas containing nonabsorbed hydrocarbon components, the improvement comprising:

(a) passing the inlet air-hydrocarbon mixture through a first absorber vessel to produce an absorber overhead gas stream and an absorber bottom liquid stream;

(b) passing the absorber bottom liquid stream to a flash vessel to flash the absorber bottom liquid stream to produce an overhead flash vapor stream and a flashed liquid stream having an affinity to absorb hydrocarbons from the inlet air-hydro on mixture;

(c) passing the flashed liquid stream from the flash vessel to the absorber vessel such that the inlet air-hydrocarbon stream is directed through the absorber vessel in direct countercurrent contact with the flashed liquid stream;

(d) passing the overhead flash vapor stream from the flash vessel to another absorber vessel such that the overhead flash vapor stream is directed through the other absorber vessel in direct countercurrent contact with a liquid absorbent stream to produce another absorber overhead stream and another absorber bottom liquid stream; and,

(e) passing the combined absorber overhead gas streams from the absorbers to a selected one of the solid adsorbent beds for adsorbing substantially all of the hydrocarbon components in the absorber overhead gas stream.

4,715,869

DEGASSING OF LIQUIDS

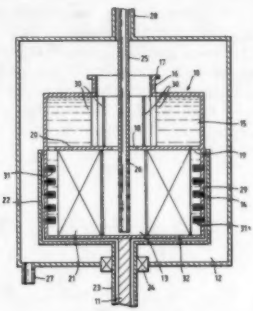
Colin Ramshaw, Warrington, England, assignor to Imperial Chemical Industries PLC, London, United Kingdom

Filed Mar. 24, 1986, Ser. No. 843,371

Claims priority, application United Kingdom, Apr. 3, 1985, 8508690

Int. Cl.[4] B01D *19/00*

U.S. Cl. 55—53 15 Claims



1. A process for the removal of a gas from a liquid in which it is sparingly soluble which comprises:

providing a rotor which includes a first annular chamber and a second superposed annular chamber, both having radially inner and outer regions, the first chamber including a permeable element having radially inner and outer regions;

feeding liquid to be processed into the radially inner region of said first chamber and rotating said rotor so that the liquid in said first chamber is subjected to an acceleration, expressed in a radial direction with respect to the axis of rotation, which is greater than the acceleration due to gravity whereby the liquid flows outwardly from the inner region of said element through the pores of said element to the outer region thereof;

feeding a displacing gas from the radially outer region of said element through the element while preventing liquid from leaving the radially outer region so that the displacing gas and liquid are in counter-current contact in the pores of said permeable element whereby gas in the liquid is removed by said displacing gas;

maintaining the liquid as the continuous phase and bubbles of the displacing gas in the dispersed phase;

collecting the liquid as it is discharged from he radially outer region of the permeable element;

passing the thus processed liquid into the second chamber through port means communicating between the radially outer regions of said first and second chambers;

discharging the liquid from said second chamber at a radially inner region thereof; and

collecting the displacing gas and the removed gas inwardly from treated liquid.

4,715,870

ELECTROSTATIC FILTER DUST COLLECTOR

Senichi Masuda, No. 415, 2-1 Nishigahara 3-chome, Kita-ku, Tokyo 114, and Naoki Sugita, Kawaguchi, both of Japan, assignors to Senichi Masuda, Tokyo, Japan

Continuation of Ser. No. 700,113, Feb. 11, 1985, abandoned. This application Oct. 6, 1986, Ser. No. 915,929

Claims priority, application Japan, Feb. 18, 1984, 59-29993

Int. Cl.[4] B03C *3/12, 3/45*

U.S. Cl. 55—132 1 Claim

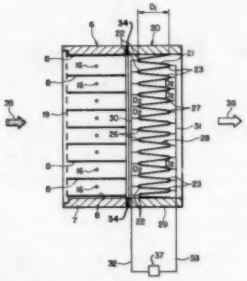
1. An electrostatic filter dust collector having a charging section through which a dust-containing gas is passed to sub-

ject the floating dust particles therein to preliminary electric charging, and a dust-containing section provided with an insulating filter member which is used to collect under the actions of an electric field the charged particles in the dust containing air passed through said charging section, characterized in that:

said charging section and said collecting section are independently framed and the charging section frame and the collecting section frame are joined together by packing;

said insulating filter member is folded so as to form ridges at the upstream and downstream sides thereof alternatively, the distance between said upstream ridges and said downstream ridges being not more than 100 mm;

a plurality of discrete insulating spacers bonded to said filter member at a respective plurality of predetermined, spaced apart levels inside the frame for retaining a distance of not more than 5 mm between the surfaces of the adjacent folded parts of said filter member, each of said spacers



extending transversely to the ridges on the upstream and the downstream sides of said filter member and including portions covering said ridges;

said ridges and the portions of the spacers which cover said ridges being coated with a conductive material to form a distinct, continuous electrode spanning each ridge;

a first electrical conducting bar extending transversely in contact with an end portion of each of said electrodes on said upstream ridges and a second electrical conducting bar extending transversely in contact with an end portion of each of said electrodes on said downstream ridges;

means for applying one of either an AC or DC high voltage between said first and second conducting bars, whereby the voltage of each upstream and downstream electrode is established only by said contact with the first and second bars, respectively.

4,715,871

DEHUMIDIFIER FOR A COMPRESSED GAS

Eiichi Uratani, No. 1-9 Mukojima 3-chome, Sumida-ku, Tokyo, Japan

Continuation of Ser. No. 910,260, Sep. 19, 1986, abandoned, which is a continuation of Ser. No. 719,212, Apr. 2, 1985, abandoned. This application Apr. 20, 1987, Ser. No. 40,752

Claims priority, application Japan, Jul. 26, 1984, 59-156403

Int. Cl.[4] B01D *46/12*

U.S. Cl. 55—222 **5 Claims**

1. A dehumidifier for a compressed gas, said dehumidifier comprising:

(a) a coiled heat exchanger pipe, said pipe having a plurality of substantially parallel spiral windings, said coiled pipe being substantially horizontal and comprising a plurality of uppermost coils and a plurality of lowermost coils;

(b) a sprinkler positioned above the uppermost coils of said pipe, said sprinkler comprising means for sprinkling water over said heat exchanger pipe;

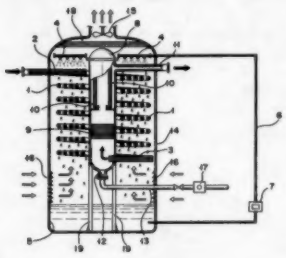
(c) a sump positioned below the lowermost coils of said pipe, said sump comprising means for receiving said sprinkled water;

(d) a water supply pipe for conducting said sprinkled water from said sump to said sprinkler;

(e) a housing, wherein said coiled pipe, said sprinkler and said sump are all positioned within said housing, and wherein said water supply pipe is positioned substantially exteriorly of said housing;

(f) a plurality of air-intake openings positioned along a wall of said housing, said air-intake openings being positioned below the lowermost coils of said pipe and above said sump;

(g) a forced air exhaust system comprising means for forcing air within said housing upwardly past said coiled pipe, said forced air exhaust system including a rotating fan positioned in an upper portion of said housing;



(h) a gas-liquid separator comprising means for removing moisture, oil and other floating material from compressed gas being conducted through the interior of said coiled pipe, said separator being located within the pipe winding having the smallest diameter;

(i) a compressed gas inlet tube for introducing gas from the exterior of said housing to said coiled pipe, the inlet tube being positioned along an upper portion of said housing; and

(j) an outlet pipe connected to an upper portion of said gas-liquid separator for conducting compressed gas from said separator to the exterior of said housing, wherein said gas-liquid separator includes a demister and at least one liquid removing element, wherein said demister is located within said separator and above an outlet header through which cooled gas enters said separator, said liquid removing element being positioned above said demister within said separator.

4,715,872

PORTABLE DUST COLLECTOR

Steven A. Snyder, Spring Valley, Ohio, assignor to Shopsmith, Inc., Dayton, Ohio

Filed Sep. 19, 1986, Ser. No. 909,739

Int. Cl.[4] B01D *46/02*

U.S. Cl. 55—315 **22 Claims**

1. A portable dust collector comprising:

housing having an outer side wall, a substantially open top, a substantially open bottom, and a dustproof chamber within an interior thereof:

a motor enclosed within said chamber;

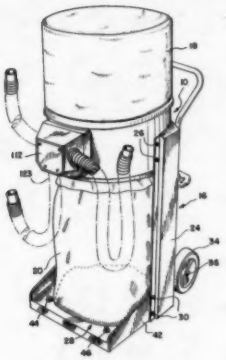
blower means driven by said motor for drawing air into said housing, said blower means being enclosed with said interior and having an inlet extending through said housing and communicating with an exterior thereof, and an outlet discharging within said housing;

said chamber and blower means being shaped to form a passageway within said chamber between said open top and bottom;

filter bag means attached to and enclosing said top for retain-

ing particulates discharged into said interior by said blower while allowing air to pass therethrough;

collection bag means attached to and enclosing said bottom for collecting particulates retained in said interior of said housing, whereby particulate-laden discharged from said



outlet circulates in the vicinity of said collection bag means and flows through said passageway to said filter bag means; and

support means attached to and extending downwardly from said housing side wall for providing clearance below said housing sufficient for said collection bag.

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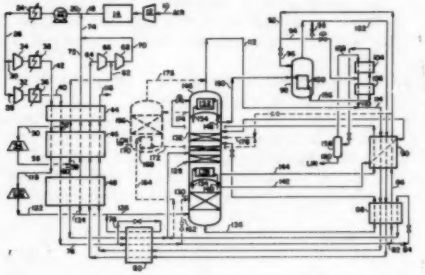
LIQUEFIED GASES USING AN AIR RECYCLE LIQUEFIER

Steven R. Auvil, Macungie, and Rakesh Agrawal, Allentown, both of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Apr. 24, 1986, Ser. No. 855,859
Int. Cl.[4] F25J *5/00*
U.S. Cl. 62—13 **26 Claims**



5. A process for the cryogenic distillative separation of air to produce at least a liquid nitrogen product, comprising the steps of:

(a) compressing feed air to an elevated pressure and removing water, carbon dioxide and condensibles from the feed air;

(b) splitting the feed air into a first split feed stream and a second split feed stream;

(c) cooling each split feed stream to a lower temperature by indirect heat exchange against process streams;

(d) expanding a first portion of the first split feed stream through a warm expander and recycling at least a first part of the expanded stream to the feed air while providing refrigeration to the feed air by indirect heat exchange;

(e) expanding the second split feed stream through a cold expander and using at least a first portion of the expanded stream for a distillation step;

(f) recycling a second portion of the expanded second split stream to the feed air while providing refrigeration to the feed air by indirect heat exchange;

(g) removing an oxygen-enriched stream from the base of the distillation column;

(h) removing a gaseous nitrogen stream from the distillation column and condensing a first portion of the gaseous nitrogen stream against a process stream;

(i) condensing a second portion of the gaseous nitrogen stream from the distillation column against at least a part of the second portion of the first split stream by indirect heat exchange to produce a liquid nitrogen product, and

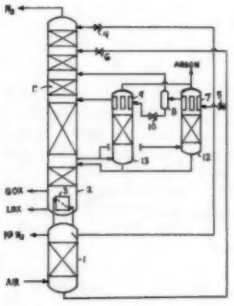
(j) recycling at least a part of the second portion of the first split stream to the feed air.

4,715,874

RETROFITTABLE ARGON RECOVERY IMPROVEMENT TO AIR SEPARATION

Donald C. Erickson, 1704 S. Harbor Ln., Annapolis, Md. 21401

Filed Sep. 8, 1986, Ser. No. 904,901
Int. Cl.[4] F25J *3/04*
U.S. Cl. 62—22 **20 Claims**



1. A process for distilling air to produce argon and oxygen of at least 98% purity comprising:

(a) rectifying at least part of the pressurized supply air to kettle liquid and liquid N_2;

(b) partially evaporating at least part of the kettle liquid at reduced pressure by exchanging latent heat with crude argon vapor;

(c) separately at least partially evaporating at least part of the liquid remnant from said first partial evaporation step by exchanging latent heat with crude argon vapor;

(d) separately feeding two vapor streams produced from steps (b) and (c) to separate heights of a nitrogen removing distillation column; and

(e) rectifying an oxygen-argon mixture from said distillation column to produce quality crude argon by refluxing said rectification step with both of the liquid crude argon streams produced by steps (b) and (c).

4,715,875

MANUFACTURE OF OPTICAL FIBRE PREFORMS

Amnon Jacobson, Tel-Aviv, Israel, assignor to Ispra Fibroptics Industries Herzlia Ltd., Israel

Division of Ser. No. 670,169, Nov. 13, 1984, Pat. No. 4,597,787.
This application Mar. 26, 1986, Ser. No. 844,131
The portion of the term of this patent subsequent to Jul. 1, 2003, has been disclaimed.
Int. Cl.[4] C03B *37/023*
U.S. Cl. 65—3.11 **18 Claims**

1. A process for the production of a glass preform useful for drawing optical fibres, which comprises:

filling the inside of a glass tube with vapors of silicon or a metal which under specific pressure and temperature conditions has a liquid phase which does not react with said glass tube, the oxide of said silicon or metal having light guiding properties, said vapors in said tube being under pressure and temperature conditions such that said tube is not substantially deformed,

subjecting said tube containing said vapors to cooling under temperature and pressure conditions such that the vapors under temperature and pressure conditions such that the vapors liquefy and coat the inside of said glass tube without reacting chemically therewith, thereby forming a coating on the inner walls of said tube with said silicon or metal in liquid condition, and

passing oxygen through the liquid silicon or metal-coated glass tube under temperature and pressure conditions such that said silicon or metal is oxidized, whereby the inner walls of said glass tube become uniformly coated with the formed silicon or metal oxide.

4,715,876

METHOD OF AND APPARATUS FOR COUPLING MULTICORE COATED OPTICAL FIBERS

Keiji Osaka; Yuichi Usui, and Tooru Yanagi, all of Yokohama, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Jun. 26, 1986, Ser. No. 878,777
Claims priority, application Japan, Jun. 28, 1985, 60-142770
Int. Cl.[4] C03B *37/16, 37/023;* **G02B** *6/38*
U.S. Cl. 65—4.21 **12 Claims**

1. A method of coupling a first end of a first multi-core coated optical fiber and a second end of a second multi-core coated optical fiber, with the first and second multi-core coated optical fibers each having multiple optical fibers integrally covered with a reinforcement coating, said method comprising:

clamping the coated portions of the first and second multi-core coated optical fibers in first and second clamp members, respectively, said clamp members being movable with said fibers to keep said first and second fibers aligned;

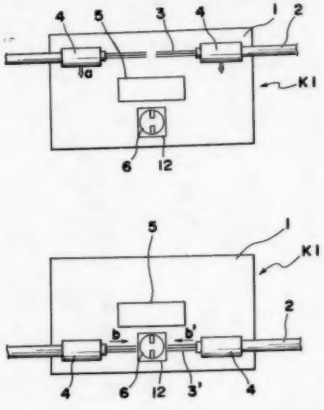
removing the reinforcement coating from the first end of the first multi-core coated optical fiber;

removing the reinforcement coating from the second end of the second multi-core coated optical fiber;

cutting off the first and second exposed fiber ends such that the optical fibers of the first multi-core coated optical fiber and the optical fibers of the second multi-core coated optical fiber have first cut end faces at the first exposed fiber ends and second cut end faces at the second exposed fiber ends, respectively; and

coupling the first and second cut end faces;

the cutting step and the coupling step being performed without detaching the first and second multi-core coated



optical fibers from the first and second clamp members, respectively

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4,715,877

APPARATUSES IN THE MANUFACTURE OF MINERAL WOOL

Tapio Moisala, Pargas, and Jukka Gustafsson, Espoo, both of Finland, assignors to AGA Aktiebolag, Lidingo, Sweden and Oy Partek AB, Pargas, Finland

Filed Sep. 2, 1986, Ser. No. 902,557
Claims priority, application Sweden, Sep. 2, 1985, 8504074
Int. Cl.[4] C03B *37/05*
U.S. Cl. 65—15 **1 Claim**

1. An apparatus for use in a mineral wool manufacturing comprising:

a furnace having an output for supply of coke and mineral material to be melted;

a first tapping spout housing an input section for receiving said molten material and a discharge section for discharging said material to an input section of a second tapping spout;

a spinning machine for receiving a tapping jet from said second spout discharge section; and

at least one oxy-fuel burner located at said discharge section of said second spout for heating with said burner's flame, said discharge section and first portion of said jet, the impulse size of said flame being predetermined to maintain unaffected the configuration and position of said tapping jet.

4,715,878

PROCESS FOR PRODUCING FINELY DIVIDED SPHERICAL GLASS POWDERS

Nelson E. Kopatz, and Lori S. Pruyne, both of Sayre, Pa., assignors to GTE Products Corporation, Stamford, Conn.

Filed Mar. 12, 1987, Ser. No. 24,952
Int. Cl.[4] C03B *19/10;* **C03C** *25/02*
U.S. Cl. 65—21.1 **7 Claims**

1. A process comprising:

(a) forming a coating of a surface active agent selected from the group consisting of nonionic surface active agents and anionic surface active agents on the surfaces of the particles of a glass powder, the average particle size of said particles being less than about 25 micrometers in diameter;

(b) feeding the resulting coated particles and a carrier gas

into a high temperature zone and maintaining said particles in said zone for a sufficient time to melt at least about 50% by weight of said particles, and to form droplets therefrom; and

(c) cooling said droplets to form glass particles having essentially a spherical shape with the majority of said glass particles having a size which is essentially the same as the size of the starting glass powder particles.

4,715,879

METHOD FOR THE MANUFACTURE OF A TEMPERED AND/OR CURVED GLASS PANE WITH REDUCED TRANSMISSION

Franz-Josef Schmitte, Rudolfstr. 1; Dieter Müller, Auf der Reihe 3, both of D-4650 Gelsenkirchen, and Rolf Groth, Holzstr. 218, D-4630 Bochum 6, all of Fed. Rep. of Germany

Filed Nov. 5, 1986, Ser. No. 927,174

Claims priority, application Fed. Rep. of Germany, Nov. 5, 1985, 3539130; Nov. 28, 1985, 3542036; Dec. 18, 1985, 3544840

Int. Cl.[4] C03C *17/00*

U.S. Cl. 65—60.2 **12 Claims**

1. Method for the manufacture of a prestressed and/or curved glass pane of soda-lime-silica glass having reduced transmission in a prescribable spectral range (in prescribable spectral ranges), in particular a sunshade pane, whereby at least one metal layer having a majority content of a metal or of a metal alloy from the elements having the atomic numbers 22 through 28 of the periodic table is applied to at least one side of a glass carrier and a protective layer of at least one metal oxide or mixed metal oxide is applied to that side thereof facing away from the glass carrier, and whereby a thermal prestressing and/or bending process is carried out in air at a temperature of 580° C. through 680° C., preferably 600° C. through 650° C., characterized in that both the metal layer as well as the protective layer are applied to the essentially planar glass carrier before the thermal prestressing and/or bending process; and in that the protective layer is applied with an oxygen deficit x, referred to a metal atom of the metal oxide or, respectively, metal oxides, of $0.05 \leqq x \leqq 0.4$ and in a thickness from 10 nm through 100 nm, being applied in such a composition that no noteworthy oxygen diffusion into the metal layer occurs during the prestressing and/or bending process.

4,715,880

TAKE OUT MECHANISM FOR GLASSWARE FORMING MACHINES

Miguel Humberto-Calderon-Quintero, San Nicolas de los Garza, Mexico, assignor to Vitro Tec Fideicomiso, Monterrey, Mexico

Filed Dec. 11, 1985, Ser. No. 808,355

Claims priority, application Mexico, Dec. 14, 1984, 203757

Int. Cl.[4] C03B *9/40*

U.S. Cl. 65—260 **4 Claims**

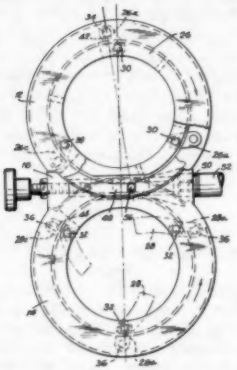
1. A take-out mechanism of particular utility in a glassware forming machine, comprising:

a ring-shaped member having an inner periphery of sufficient diameter to accomodate a formed glassware article;

means supporting said ring-shaped member in axially fixed relationship to said formed article;

gripping fingers pivotally mounted in horizontal position on said ring-shaped member and moveable between a retracted position in which they are positioned outwardly of said inner periphery of said ring-shaped member, and a gripping position in which they extend radially inwardly of said inner periphery of said ring-shaped member and into gripping relationship with a said article;

a crown ring rotatable on said ring-shaped member for moving said gripping fingers between said retracted and extended positions, said crown ring having surfaces cooperating with pins carried by the respective said gripping members; and,



an actuator connected to said crown ring and operative to rotate said crown ring through a determined angle to adjust the position of said gripping fingers radially inwardly and radially outwardly of the inner periphery of said ring-shaped member.

4,715,881

CONTROL OF EASTERN BLACK NIGHTSHADE WITH A FUNGAL PATHOGEN

Robert N. Andersen, St. Paul, Minn., and Harrell L. Walker, Ruston, La., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed May 29, 1985, Ser. No. 738,707

Int. Cl.[4] C12N *1/14;* C12R *1/645;* A01N *63/00;* A01H *1/00*

U.S. Cl. 71—79 **10 Claims**

1. A method for controlling plants of the genus Solanum comprising inoculating a susceptible plant of the genus Solanum with an effective amount of a strain of the fungus *Colletotrichum coccoides* having all the identifying characteristics of NRRL 15547.

4,715,882

SUBSTITUTED PHENOXYPROPIONALDEHYDE DERIVATES AND THEIR USE AS HERBICIDAL AGENTS

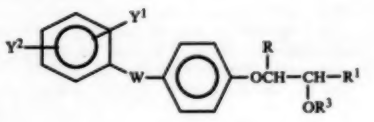
Muppala S. Raju, Akron, Ohio, assignor to PPG Industries, Inc., Pittsburgh, Pa.

Division of Ser. No. 797,310, Nov. 12, 1986, Pat. No. 4,661,149. This application Oct. 15, 1986, Ser. No. 918,955

Int. Cl.[4] C07C *69/612, 43/205;* A01N *57/06, 31/04, 37/34, 37/10*

U.S. Cl. 71—86 **4 Claims**

1. A compound of the Formula:



wherein

Y^1 and Y^2 are independently hydrogen, halogen, nitro, cyano, or lower alkyl, haloalkyl or alkoxy;

W is oxygen or sulfur;

R is hydrogen or lower alkyl or alkoxy;

R^1 is cyano, vinyl, acetynyl, lower dialkylphosphinyl or dialkylphosphonyl;

R^3 is hydrogen, or up to C_{10} alkyl, cycloalkyl, haloalkyl, hydroxyalkyl, oxoalkyl, alkoxyalkyl, alkenyl, alkynyl or $-COR^6$ or $-CSR^6$ wherein R^6 is up to C_{10} alkyl, cycloalkyl, haloalkyl, alkoxy, alkenyl, alkynyl, amino, $-COOR^7$ or $-COSR^7$ wherein R^7 is hydrogen, alkali metal, up to C_{10} alkyl, cycloalkyl, haloalkyl, alkenyl or alkynyl.

3. A herbicidal composition containing an agronomically acceptable carrier and a herbicidally effective amount of a compound or mixture of compounds defined in claim 1.

4,715,883

THIADIAZOLYL-GLYOXYLONITRILE-2-OXIME ETHER DERIVATIVES FOR PROTECTING PLANT CROPS

Alfons Lukaszczyk, Basel; Henry Martin, Allschwil; Peter J. Diel, Muttenz; Werner Föry; Karl Götzi, both of Basel; Haukur Kristinsson, Bottmingen; Beat Müller, Reinach; René Muntwyler, Hofstetten; Johannes P. Pachlatko, Rheinfelden; Hermann Rempfler, Ettingen; Rolf Schurter, Binningen, and Henry Szczepanski, Rheinfelden, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

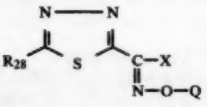
Division of Ser. No. 232,752, Feb. 9, 1981, Pat. No. 4,388,464, which is a division of Ser. No. 70,288, Aug. 28, 1979, Pat. No. 4,347,372. This application Sep. 24, 1982, Ser. No. 423,354

Claims priority, application Switzerland, Sep. 1, 1978, 9255/78

Int. Cl.[4] A01N *43/82*

U.S. Cl. 71—90 **12 Claims**

1. A composition for reducing the phytotoxic effects of herbicides on cultivated plants which comprises (1), as an antidote, a effective amount of a compound of the formula



wherein

R_{28} is lower alkoxy, lower alkylthio, lower alkylsulfinyl, lower alkylsulfonyl or phenyl,

Q is hydrogen, lower alkyl which csn be interrupted by oxygen or sulfur, or substituted by halogen or cyano, or an carboxylic acyl radical, and

X is hydrogen, cyano, halogen, C_1-C_{10} alkyl, lower alkanoyl, —COOH, —COO-lower alkyl, —COS-lower alkyl, $-CON(R)_2$ in which R is hydrogen or lower alkyl and (2) a suitable carrier therefor.

4,715,884

HERBICIDAL CYCLOHEXANE-1,3-DIONE DERIVATIVES

Keith G. Watson, Box Hill North, Australia, assignor to Imperial Chemical Industries PLC, London, England

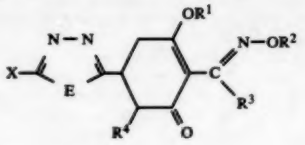
Division of Ser. No. 604,967, Apr. 27, 1984, Pat. No. 4,604,132. This application Jul. 11, 1986, Ser. No. 884,365

Claims priority, application Australia, May 6, 1983, PF9198

Int. Cl.[4] C07D *271/06, 285/08;* A01N *43/82*

U.S. Cl. 71—90 **8 Claims**

1. A compound of formula



wherein:

E is selected from oxygen and sulfur;

X is selected from the group consisting of C_1 to C_3 alkyl, C_1 to C_3 alkoxy and C_1 to C_3 alkylthio;

R^1 is selected from the group consisting of hydrogen and the alkali metals;

R^2 is selected from the group consisting of C_1 to C_3 alkyl, allyl and propargyl;

R^3 is selected from the group consisting of C_1 to C_3 alkyl; and

R^4 is hydrogen.

4,715,885

HERBICIDAL PYRAZOLE SULFONYLUREAS

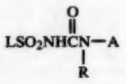
Barry A. Wexler, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 678,409, Dec. 10, 1984, Pat. No. 4,622,062, which is a continuation-in-part of Ser. No. 578,344, Feb. 9, 1984, abandoned. This application Sep. 10, 1986, Ser. No. 890,711

Int. Cl.[4] C07D *403/12, 405/12, 417/12;* A01N *43/66*

U.S. Cl. 71—91 **45 Claims**

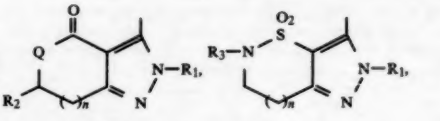
1. A compound selected from



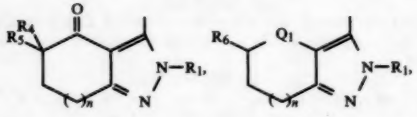
wherein

R is H or CH_3;

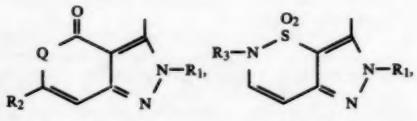
L is



L-1 L-2



L-3 L-4



L-5 L-6

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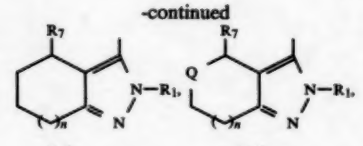
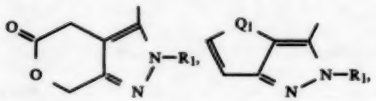
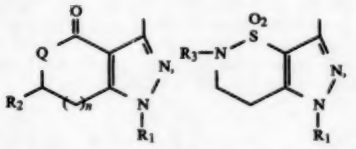


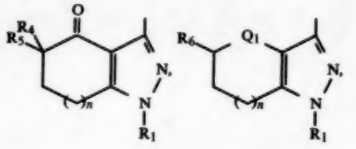
L-7 L-8



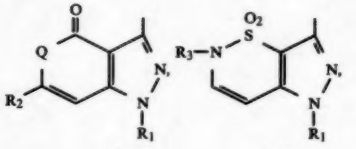
L-9 L-10



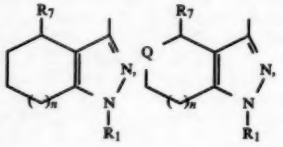
L-11 L-12



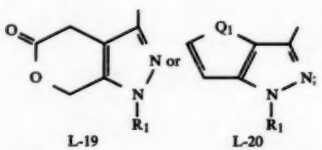
L-13 L-14



L-15 L-16



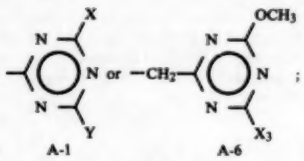
L-17 L-18



L-19 L-20

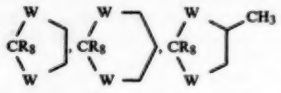
R_1 is H, C_1–C_3 alkyl, $CH_2CH{=}CH_2$, $CH_2C{\equiv}CH$, CH_2CF_3, CHF_2, phenyl, phenyl substituted with NO_2, CH_3, OCH_3, Cl, Br or F,

SO_2CH_3, $SO_2N(CH_3)_2$ or CO_2CH_3;
R_2 is H or C_1–C_3 alkyl;
R_3 is H, C_1–C_3 alkyl or CHF_2;
R_4 is H, Cl or CH_3;
R_5 is H, Cl or CH_3;
R_6 is H or C_1–C_3 alkyl;
R_7 is H or CH_3;
n is 0 or 1;
Q is O, S or NCH_3;
Q_1 is O, S or SO_2;
A is



A-1 A-6

X is CH_3, OCH_3, OC_2H_5, CF_3, or CFH_2;
Y is H, C_1–C_3 alkyl, OCH_3, OCH_2CH_3, CH_2OCH_3, $SeCH_3$, $CH_2OCH_2CH_3$, NH_2, $NHCH_3$, $N(CH_3)_2$, CF_3, SCH_3, $OCH_2CH{=}CH_2$, $OCH_2C{\equiv}CH$, OCH_2CF_3, $OCH_2CH_2OCH_3$, CH_2SCH_3, SCF_2H, cyclopropyl, $CR_8(WCH_3)_2$,



or $CR_8(WCH_2CH_3)_2$;
R_8 is H or CH_3;
W is O or S;
Z is N; X_3 is CH_3 or OCH_3;
provided that when Y is $SeCH_3$, then X is CH_3, OCH_3, OCH_2CH_3, or CF_3.

16. A composition suitable for controlling the growth of undesired vegetation which comprises an effective amount of a compound of claim 1 and at least one of the following: surfactant, solid or liquid diluent.

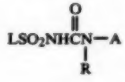
4,715,886

HERBICIDAL PYRAZOLE SULFONAMIDES

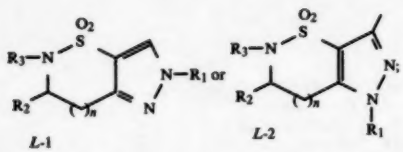
Barry A. Wexler, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 726,386, Apr. 23, 1985, Pat. No. 4,671,817. This application Mar. 16, 1987, Ser. No. 26,416
Int. Cl.[4] C07D *513/04;* A01N *47/36*
U.S. Cl. 71—91 **24 Claims**

1. A compound selected from



wherein
L is



L-1 L-2

R is H or CH_3;

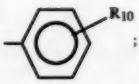
R_1 is H, C_1–C_3 alkyl, $CH_2CH{=}CH_2$, $CH_2C{\equiv}CH$, CH_2CF_3, CHF_2, $C(O)CH_3$, SO_2CH_3, $SO_2N(CH_3)_2$, CO_2CH_3, phenyl or phenyl substituted with NO_2, CH_3, OCH_3, Cl, Br or F;

n is 0 or 1;

R_2 is H or CH_3;

R_3 is R_4, SR_4, SO_2R_4, OR_4, $C(O)R_4$, $C(O)OR_4$, $(C(O))_2OR_4$, $(CO)_2R_4$, $C(O)NR_5R_6$, $C(O)NRA$, $C(S)SR_4$, NR_5R_6, OH, CN, $P(O)R_7R_8$, $P(S)R_7R_8$, $Si(CH_3)_2R_9$, J or $C(O)J$;

R_4 is C_1–C_{10} alkyl, C_2–C_{10} alkoxyalkyl, C_2–C_{10} alkenyl, C_2–C_{10} epoxyalkyl, C_2–C_{10} alkynyl, C_3–C_6 cycloalkyl, C_4–C_7 cycloalkylalkyl or

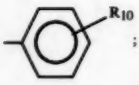


when R_4 is C_3–C_6 cycloalkyl or C_4–C_7 cycloalkylalkyl it may optionally be substituted by C_1–C_4 alkyl, 1 to 3 atoms of Cl or F or 1 Br; when R_4 is C_1–C_{10} alkyl, C_2–C_{10} alkenyl or C_2–C_{10} alkynyl it may optionally be substituted by one or more halogens and/or by $(R_{11})_p$, provided that when p is 2, the values of R_{11} may be identical or different;

p is 1 or 2;

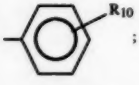
R_5 is H or C_1–C_4 alkyl;

R_6 is H, C_1–C_{10} alkyl, C_1–C_{10} haloalkyl, C_2–C_{10} alkenyl, C_2–C_{10} alkynyl, C_3–C_6 cycloalkyl or



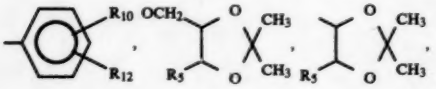
R_7 and R_8 are independently C_1–C_4 alkyl, C_1–C_4 alkoxy or C_1–C_4 alkylthio;

R_9 is C_1–C_{10} alkyl, benzyl or



R_{10} is H, F, Cl, Br, CH_3, OCH_3, NO_2, CN, SCH_3, SO_2CH_3 or CF_3;

R_{11} is OR_6, $OC(O)R_6$, $P^+R_9R_{13}R_{14}$, $P^+(C_6H_5)_3$, $OC(O)NR_5R_6$, OSO_2R_6, $OP(O)R_7R_8$, $P(O)R_7R_8$, $OP(S)R_7R_8$, $P(S)R_7R_8$, $OSi(CH_3)_2R_9$, $Si(CH_3)_2R_9$, SR_6, SOR_6, SO_2R_6, SCN, CN, $SP(O)R_7R_8$, $SP(S)R_7R_8$, $N^+R_5R_6R_9$, NR_5R_6, $NR_5C(O)R_6$, $NR_5C(O)OR_6$, $NR_5C(O)NR_5R_6$, $NR_5SO_2R_6$, $NR_5P(O)R_7R_8$, $NR_5P(S)R_7R_8$, NO_2, $C(O)R_6$, $C(O)OR_6$, $C(O)NR_5R_6$, SeR_6, naphthyl, J,



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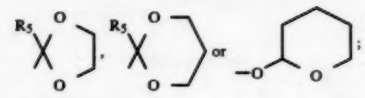
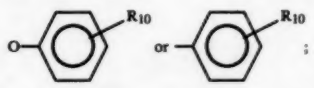


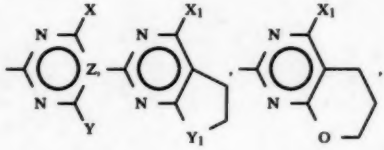
R_{12} is H, F, Cl, Br, CH_3,



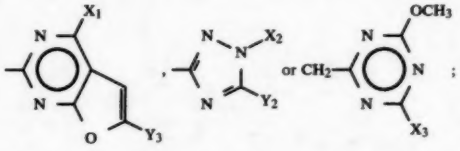
R_{13} and R_{14} are independently C_1–C_3 alkyl;

J is a 5- or 6-membered aromatic heterocycle, a 5- or 6-membered dihydroaromatic heterocycle or a 5- or 6-membered tetrahydroaromatic heterocycle which contains 1–4 heteroatoms selected from 0–1 oxygen atoms, 0–1 sulfur atoms and/or 0–4 nitrogen atoms and these heterocycles may optionally be substituted by 1–4 CH_3, 1–2 OCH_3, SCH_3, Cl, $N(CH_3)_2$ or CN groups or J is a 5- or 6-membered lactone, lactam or cycloalkanone which may optionally be substituted by 1–4 CH_3 groups;

A is



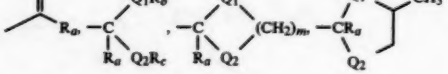
A-1 A-2 A-3



A-4 A-5 A-6

X is H, C_1–C_4 alkyl, C_1–C_4 alkoxy, C_1–C_4 haloalkoxy, C_1–C_4 haloalkyl, C_1–C_4 haloalkylthio, C_1–C_4 alkylthio, C_2–C_5 alkoxyalkyl, C_2–C_5 alkoxyalkoxy, amino, C_1–C_3 alkylamino, di(C_1–C_3 alkyl)amino or C_3–C_5 cycloalkyl;

Y is H, C_1–C_4 alkyl, C_1–C_4 alkoxy, C_1–C_4 haloalkoxy, C_1–C_4 haloalkylthio, C_1–C_4 alkylthio, C_2–C_5 alkoxyalkyl, C_2–C_5 alkoxyalkoxy, amino, C_1–C_3 alkylamino, di(C_1–C_3 alkyl)amino, C_3–C_4 alkenyloxy, C_3–C_4 alkynyloxy, C_2–C_5 alkylthioalkyl, C_2–C_5 alkylsulfinylalkyl, C_2–C_5 alkylsulfonylalkyl, C_1–C_4 haloalkyl, C_2–C_4 alkynyl, azido, cyano,



or $N(OCH_3)CH_3$;

m is 2 or 3;

Q_1 and Q_2 are independently O or S;

R_a is H or C_1–C_3 alkyl;

R_b and R_c are independently C_1–C_3 alkyl;

Z is N, CCH_3, CC_2H_5, CCl or CBr;

Y_1 is O or CH_2;
X_1 is CH_3, OCH_3, OC_2H_5 or OCF_2H;
X_2 is CH_3, C_2H_5 or CH_2CF_3;
Y_2 is OCH_3, OC_2H_5, SCH_3, SC_2H_5, CH_3 or CH_2CH_3;
X_3 is CH_3 or OCH_3; and
Y_3 is H or CH_3;
provided that
1. when R_3 is R_4, then R_4 is other than C_1–C_3 alkyl or CF_2H;
2. the total number of carbon atoms in R_3 does not exceed 13;
3. when R_6 is H, then R_{11} is other than SOR_6, SO_2R_6, OSO_2R_6 or $NR_5CO_2R_6$; and
4. X and/or Y are other than OCF_2H.

4,715,887

SUBSTITUTED TRIAZOLYL-METHYL-TERT-BUTYL CARBINOL COMPOUNDS AND PLANT PROTECTION AGENTS

Wolfgang Krämer, Wuppertal; Karl H. Büchel, Burscheid; Paul-Ernst Frohberger, Leverkusen; Wilhelm Brandes, Leichlingen, and Klaus Lürssen, Bergisch Gladbach, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Continuation of Ser. No. 321,290, Nov. 13, 1981, abandoned, which is a continuation of Ser. No. 213,705, Dec. 5, 1980, abandoned. This application Dec. 21, 1984, Ser. No. 684,178

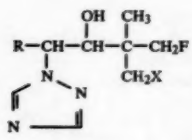
Claims priority, application Fed. Rep. of Germany, Dec. 19, 1979, 2951163

The portion of the term of this patent subsequent to Dec. 8, 2004, has been disclaimed.

Int. Cl.[4] C07D *249/08*; A01N *43/653*; A61K *31/41*

U.S. Cl. 71—92 **22 Claims**

1. A substituted triazolylmethyl-tert.-butyl carbinol of the formula



wherein
R is cyclohexylmethyl, 4-chlorobenzyl or 2,4-dichlorobenzyl, and
X is hydrogen, or fluoro,
and a hydrochloric acid addition salt thereof.

10. Method of protecting plants, against fungus growth which method comprises applying to the plants or their habitat an effective amount of a substituted triazolylmethyl tert.-butyl carbinol compound as claimed in claim 1.

18. Method of plant growth regulation comprising applying to the plants or their habitat an effective amount of a substituted triazolylmetyl tert.-butyl carbinol compound as claimed in claim 1.

4,715,888

HERBICIDAL AGENTS CONTAINING PHOTOSYNTHESIS-INHIBITING HERBICIDES IN COMBINATION WITH PYRIDINECARBOXAMIDES

Gerhard Marzolph, Cologne; Winfried Lunkenheimer, Wuppertal, and Carl Fedtke, Cologne, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Aug. 21, 1984, Ser. No. 642,976

Claims priority, application Fed. Rep. of Germany, Sep. 7, 1983, 3332272

Int. Cl.[4] A01N *43/64, 43/40*

U.S. Cl. 71—93 **9 Claims**

1. A herbicidal composition consisting essentially of a herbicidally effective and selective amount of
(a) a photosynthesis-inhibiting active compound (herbicide) plus
(b) 0.25 to 100 times its weight of pyridine-2-carboxylic acid N-tert.-butylamide.

4,715,889

QUINOLINE DERIVATIVES AND THEIR USE FOR CONTROLLING UNDESIRABLE PLANT GROWTH

Helmut Hagen, Frankenthal; Rolf-Dieter Kohler, Edingen-Neckarhausen; Jürgen Markert, Mutterstadt, and Bruno Wuerzer, Otterstadt, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

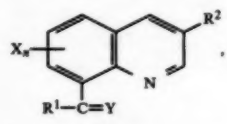
Filed Sep. 7, 1983, Ser. No. 530,084

Claims priority, application Fed. Rep. of Germany, Sep. 7, 1982, 3233089

Int. Cl.[4] A01N *43/42*; C07D *215/48*

U.S. Cl. 71—94 **15 Claims**

1. A quinoline derivative of the formula



(I)

wherein
X is chlorine in position 5 or 7 and n is 1 or 2, Y is oxygen, R^1 is $—NR^3R^4$, where R^3 and R^4 are identical or different and are each hydrogen, C_1–C_6-alkyl, C_2–C_6-alkenyl, C_1–C_6-hydroxyalkyl, formyl, cyclohexyl, phenyl or pyridyl, or $N(CH_3)$, or R^1 is OM, where M is one equivalent of an alkali metal or alkaline earth metal ion, hydrogen, or is $H_2NR^3R^4$, where R^3 and R^4 have the above meanings, and R^2 is hydrogen, or C_1–C_4-alkyl which is unsubstituted or substituted in the ω-position by halogen, amino, monoalkylamino, dialkylamino or trialkylammonium where alkyl is of 1 to 4 carbon atoms, C_1–C_4-alkoxy, or is formyl, cyano, carboxy or C_2–C_6-alkenyl, with the proviso that R^2 is not hydrogen when

is carboxyl.

6. A herbicidal composition containing inert additives and an effective amount of a quinoline derivative of the formula I as defined in claim 1.

7. A process for combating the growth of unwanted plants, wherein the unwanted plants and/or their location are treated with a herbicidally effective amount of a composition as defined in claim 6.

4,715,890

METHOD OF PREPARING A MAGNETIC MATERIAL

Stanford R. Ovshinsky, Bloomfield Hills; Stephen J. Hudgens, Southfield; David D. Allred, Troy, and Gregory Demaggio, Bloomfield Hills, all of Mich., assignors to Ovonic Synthetic Materials Company, Inc., Troy, Mich.

Filed Oct. 17, 1986, Ser. No. 919,934

Int. Cl.[4] C22C *1/04*

U.S. Cl. 75—0.5 AA **13 Claims**

1. A method of forming a magnetic material of the transition metal-rare earth metal-boron type comprising a solid mass of grains, which method comprising the steps of:
(a) forming a solution of a reducible iron halide, a reducible rare earth halide, and lithium borohydride in an aprotic solvent;
(b) reducing the compounds and precipitating a tetragonal,

$RE_2Tm_{14}B$-type composition having a morphology characterized by one or more of

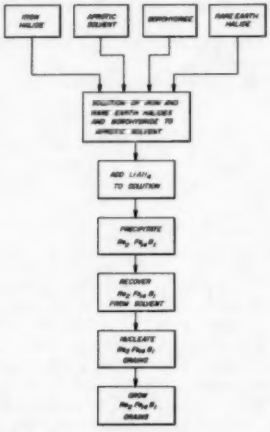
(i) amorphous;

(ii) microcrystalline; and

(iii) polycrystalline; wherein the grains thereof have an average grain characteristic dimension less than that of the optimal enhanced remanence magnetic material; and

(c) heat treating the precipitate to form a solid material characterized in that the grains meet adjacent grains at grain boundaries therebetween, the grains and grain boundaries therebetween being characterized by:

(i) the grains having an average grain characteristic dimension;



(ii) individual grains having an easy axis of the magnetization and an individual grain characteristic dimension within a distribution about the average grain characteristic dimension; and

(iii) the grain boundaries having a characteristic dimension small enough to allow interaction between surface atoms of adjacent grains across the grain boundaries, thereby forming a permanent magnetic material such that the grain-grain interaction in the heat treated material substantially equals the magnetic anisotropy field of the individual grains;

the magnetic material being characterized by:

(1) a maximum magnetic energy product, $(BH)_{max}$, greater than 15 megagaussoersteds; and

(2) a remanence greater than 8 kilogauss.

4,715,891

METHOD OF PREPARING A MAGNETIC MATERIAL

Stanford R. Ovshinsky, Bloomfield Hills; Stephen J. Hudgens, Southfield; David D. Allred, Troy, and Gregory DeMaggio, Bloomfield Hills, all of Mich., assignors to Ovonic Synthetic Materials Company, Inc., Troy, Mich.

Filed Oct. 17, 1986, Ser. No. 919,935

Int. Cl.[4] H01F *1/02*

U.S. Cl. 75—0.5 BA **13 Claims**

1. A method of forming an enhanced isotropic remanence magnetic material comprising a solid mass of grains of an alloy of the rare earth-transition metal - boron type having $P4_2/mnm$ tetragonal crystallography, which method comprises the steps of:

(a) vaporizing precursors of the magnetic material;

(b) condensing the precursors of the magnetic material whereby to form a condensate solid alloy having a fine grain morphology characterized by one or more of:

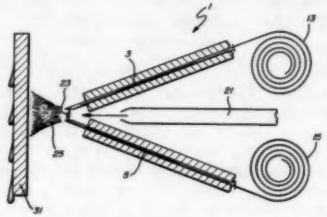
(i) amorphous,

(ii) microcrystalline, and

(iii) polycrystalline;

wherein the grains thereof have an average grain characteristic dimension less than that of the enhanced remanence magnetic material; and

(c) heat treating the fine grain solid to form a magnetic material comprised of grains having a characteristic dimension, R_o, of about 200 Angstroms such that the grain-grain interaction between adjacent grains substantially



equals the magnetic anisotropy field of the individual grains, and magnetically aligns grains away from their easy axis of magnetization, the grains meeting at grain boundaries having a characteristic dimension small enough to allow the grain-grain interaction between adjacent grains, so as to form an enhanced remanence magnetic material having an isotropic maximum magnetic energy product, $(BH)_{max}$, greater than 15 megaGaussOersteds and an isotropic remanence greater than 9 kiloGauss.

4,715,892

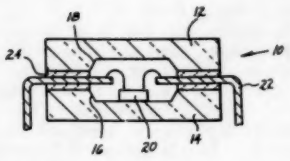
CERMET SUBSTRATE WITH GLASS ADHESION COMPONENT

Deepak Mahulikar, Meriden, Conn., assignor to Olin Corporation, New Haven, Conn.

Continuation-in-part of Ser. No. 838,866, Mar. 12, 1986. This application Oct. 30, 1986, Ser. No. 922,271

Int. Cl.[4] C22C *29/12*

U.S. Cl. 75—233 **29 Claims**



1. The process of forming a composite material, comprising the steps of:

providing a mixture of from about 25 to about 80 volume % of metallic material in the form of particles, from an effective amount up to about 10 volume % of binder in the form of particles of glass, and the balance essentially ceramic particles;

mixing said glass particles with said ceramic particles whereby said ceramic particles are coated with said glass particles;

mixing the glass coated ceramic particles with said metallic particles;

compacting said mixture; and heat treating the compacted mixture to form a matrix comprising the metallic material with said glass coated ceramic particles distributed within said matrix.

4,715,893

ALUMINUM-IRON-VANADIUM ALLOYS HAVING HIGH STRENGTH AT ELEVATED TEMPERATURES

David J. Skinner, Flanders; Richard L. Bye, Jr., Morristown; Kenji Okazaki, Basking Ridge, and Colin M. Adam, Morristown, all of N.J., assignors to Allied Corporation, Morris Township, Morris County, N.J.

Filed Apr. 4, 1984, Ser. No. 596,741

Int. Cl.[4] C22C *21/00, 21/10, 21/12;* B22F *9/06*

U.S. Cl. 75—249 11 Claims

1. An aluminum-base alloy consisting essentially of the formula $Al_{bal}Fe_aV_bX_c$, wherein X is at least one element selected from the group consisting of Zn, Co, Ni, Cr, Mo, Zr, Ti, Hf, Y and Ce, "a" ranges from about 7–15 wt %, "b" ranges from about 2–10 wt % "c" ranges from about 0–5 wt % and the balance is aluminum, said alloy having been uniformly quenched at a cooling rate of at least about 10^7° C./sec by being forced under pressure through a slotted nozzle and into contact with a casting surface in close proximity thereto and moving at a speed of at least about 4000 ft/min, and having a microstructure which is at least about 50% composed of a generally spherical, intermetallic O-phase.

4,715,894

USE OF IMMERSION TIN AND TIN ALLOYS AS A BONDING MEDIUM FOR MULTILAYER CIRCUITS

Abraham M. Holtzman, Bat Yam, and Joseph Relis, Ramat Gan, both of Israel, assignors to Techno Instruments Investments 1983 Ltd., Bat-Yam, Israel

Filed Aug. 29, 1985, Ser. No. 770,842

Int. Cl.[4] C23C *18/46*

U.S. Cl. 106—1.22 16 Claims

1. An immersion metal composition comprising:
(a) a thiourea compound
(b) a urea compound
(c) a metal salt
said metal salt being selected from the group of salts based on the Group IVA metals including tin, Group VIII metals, Group IB metals, Group IIB metals and Group IIIA metals, said urea compound and thiourea compound each being present in an amount sufficient to enable said compositon to function as an immersion composition.

4,715,895

METHOD OF PRODUCING MOLDS FOR THE CASTING OF METAL

Friedhelm Schnippering, Siegburg, and Karl-Martin Rödder, Troisdorf-Spich, both of Fed. Rep. of Germany, assignors to Dynamit Nobel AG, Troisdorf Bez Koeln, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 768,914, Sep. 15, 1984, abandoned, which is a continuation of Ser. No. 593,176, Mar. 26, 1984, abandoned, which is a continuation of Ser. No. 430,093, Sep. 30, 1982, abandoned. This application Sep. 15, 1986, Ser. No. 908,879

Claims priority, application Fed. Rep. of Germany, Oct. 30, 1981, 3143036

Int. Cl.[4] B28B *7/28*

U.S. Cl. 106—38.3 10 Claims

1. A method of making a mold for casting metal, comprising:
(a) providing a permanent model of the mold;
(b) spraying a layer of an anhydrous fluid ceramic slip which cures without the addition of water onto the surface of the model, the fluid ceramic slip comprising granular refractory substances, a binding agent of a partially-condensed and partially-hydrolized alkyl silicate containing hydroxyl groups and between 18 and 25%, by weight, SiO_2, and no hardener;
(c) thereafter sanding the slip layer by throwing a sanding material thereinto, the sanding material comprising a granular refractory substance having a grain size between 0.07 and 0.25 mm and a hardener, the hardener comprising means comprisng at least one amine for hardening the slip by chemical action;
(d) allowing the hardener to so harden the slip; and
(e) removing the hardened slip from the model for use as the mold.

4,715,896

CEMENTITIOUS BINDER FOR CONSOLIDATED FILL

William A. Berry, Burlington, Canada, assignor to Standard Slag Cement, Toronto, Canada

Filed Aug. 4, 1986, Ser. No. 892,445

Int. Cl.[4] C04B *7/14, 7/02, 2/02*

U.S. Cl. 106—117 8 Claims

1. A water-hardenable cementitious material for consolidated fill comprising in admixture an aggregate suitable for use in consolidated fill and a binder the binder, consisting essentially of:
(a) about 55 to 97 parts by weight of finely divided, water-hardenable, vitrified, cementitious, iron blast furnace slag;
(b) about 3 to about 45 parts by weight of Class C fly ash; and
(c) an alkaline activator elevating the pH of the composition above about 11 in the presence of water, the activator being calcium hydroxide in an amount of about 2 to about 15% by weight based on the total weight of said slag plus said fly ash.

4,715,897

ESTERS AS PITCH PLASTICIZERS

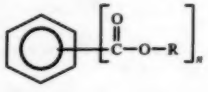
James A. Tallon, Grafton, and Richard T. Lewis, Parma Heights, both of Ohio, assignors to Union Carbide Corporation, Danbury, Conn.

Continuation of Ser. No. 596,365, Apr. 3, 1984, abandoned. This application May 13, 1986, Ser. No. 862,695

Int. Cl.[4] C08L *95/00*

U.S. Cl. 106—284 24 Claims

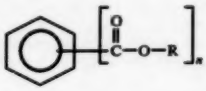
1. A process for making a carbon body which comprises; (a) providing a mixture comprising carbonaceous particles, pitch binder, and a plasticizing agent in an amount between about 1 and about 6 wt.%, based on the weight of the pitch binder; (b) extruding the mixture to prepare extruded composite, and (c) baking the composite to form the carbon body, wherein the plasticizing agent is benzenepolycarboxylic acid ester soluble in the pitch binder and having the structure;



wherein n is between 2 and 6, and wherein each R is the same or different from the other R groups, and each R is a substituted or unsubstituted alkyl, alkenyl, or aryl group having 1 to 10 carbon atoms, wherein the permissible substituents on the R groups are selected from the groups of amino, hydroxy, halo, cyano, nitro, oximino, alkoxy, alkylthio, alkylsulfinyl and alkylsulfonyl.

11. A mixture used for extruding carbon bodies comprising carbonaceous particles, a coal tar or petroleum pitch binder and between about 1 wt.% and about 6 wt.%, based on the weight of the pitch, of a plasticizing agent soluble in the pitch

binder, said plasticizing agent comprising a benzenepolycarboxylic acid ester having the structure;



wherein n is between 2 and 6, and wherein each R is the same or different from the other R groups, and each R is a substituted or unsubstituted alkyl, alkenyl, or aryl group having 1 to 10 carbon atoms, wherein the permissible substituents on the R groups are selected from the group of amino, hydroxy, halo, cyano, nitro, oximino, alkoxy, alkylthio, alkylsulfinyl and alkylsulfonyl.

4,715,898

SULFONIUM RESINS USEFUL AS PIGMENT GRINDING VEHICLES IN CATIONIC ELECTRODEPOSITION

Mark W. Johnson, Glenshaw, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Jun. 30, 1986, Ser. No. 880,379
Int. Cl.[4] C04B *14/00*; C08G *59/14, 59/40*
U.S. Cl. 106—308 Q **16 Claims**

1. A cationic resin suitable for use as a pigment grinding vehicle capable of producing smooth films while maintaining high rupture voltages which is derived from an epoxy resin and which contains ternary sulfonium groups and alkyl phenoxide groups in which the alkyl group contains at least 4 carbon atoms; said cationic resin containing from 0.25 to 1.4 milliequivalents of ternary sulfonium group per gram of resin and containing from 1.9 to 25 percent by weight of alkyl phenoxide groups based on weight of cationic resin; said alkyl phenoxide groups being present in the cationic resin by reaction of the corresponding alkyl phenol with epoxide functionality of the epoxy resin.

4,715,899

LIQUID CLEANER CONTAINING INACTIVATED PROTEASE FOR PROTEIN SOILED CONTACT LENSES

Subir Chanda, 17 Arlington Dr., Pittsford, N.Y. 14534; Thomas M. Riedhammer, 52 Appian Dr., Rochester, N.Y. 14606, and Andrew M. Tometsko, 105 Brooklawn Dr., Rochester, N.Y. 14618

Division of Ser. No. 435,851, Oct. 21, 1982, abandoned. This application Apr. 11, 1984, Ser. No. 599,123
Int. Cl.[4] B08B *3/08*
U.S. Cl. 134—26 **8 Claims**

1. A process for removing proteinaceous deposits on contact lenses comprising the steps of:

(i) contacting said contact lens with an aqueous solution of a mild thiol reducing agent wherein the aqueous solution is isotonic to the human eye and said thiol reducing agent is selected from group consisting of: cysteine, mercaptoethanol, sodium thiosulfate, ascorbic acid, glutathione and mixtures thereof;

(ii) admixing with said solution containing said lens an effective amount of an allosterically inactivated sulfhydryl protease, to remove said proteinaceous deposit from said lens, said protease having been inactivated by reaction with sodium tetrathionate; and

(iii) allowing said lens to remain in the admixture until said proteinaceous deposit is removed.

4,715,900

AZEOTROPIC COMPOSITIONS OF TRICHLOROTRIFLUOROETHANE, DICHLORODIFLUOROETHANE AND METHANOL/ETHANOL

Helen A. Connon, Wilmington; Robert A. Gorski, Newark; William G. Kenyon, Wilmington, and Akimichi Yokozeki, Greenville, all of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jan. 8, 1987, Ser. No. 1,454
Int. Cl.[4] B08B *3/08*; C11D *7/50*
U.S. Cl. 134—31 **10 Claims**

1. An azeotrope or azeotrope-like composition comprising about 67–81 weight percent 1,1,2-trichloro-1,2,2-trifluoroethane and 15–26 weight percent 1,2-dichloro-1,1difluoroethane and about 3–7 weight percent methanol.

2. An azeotrope or azeotrope-like composition comprising about 59–66 weight percent 1,1,2-trichloro-1,2,2-trifluoroethane and 31–39 weight percent 1,2-dichloro-1,1-difluoroethane and about 2–4 weight percent ethanol.

4,715,901

ARCHITECTURAL PRODUCT

Douglas A. Granger, Murrysville, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.

Continuation of Ser. No. 533,348, Sep. 19, 1983, abandoned. This application Sep. 17, 1985, Ser. No. 776,934
Int. Cl.[4] C22F *1/04*
U.S. Cl. 148—2 **32 Claims**

1. The method of producing an improved aluminum sheet product having substantial freedom from structural streaking in an electrochemically or chemically treated condition, said method comprising:

(1) formulating an aluminum base alloy consisting essentially of:

(a) at least 98.5% aluminum, 0.25 to 1% Fe, 0.05 to 0.4% Si, not more than 0.3% of any other element except aluminum; or

(b) 0.3 to 2.5% Mg, 0.25 to 1% Fe, 0.05 to 0.5% Si

said formulating including the step of adding one or more metal additives from the group consisting of Cr, Mn, Ni, Zr, V, Co, Mo and the rare earth elements so as to include in said alloy 0.01 to 0.08% each for one or more of such elements so added but not more than 0.2% combined total for all such elements, the balance of said alloy being aluminum and incidental elements and impurities;

(2) casting an ingot of said alloy; and

(3) producing said sheet from said ingot.

4,715,902

PROCESS FOR APPLYING THERMAL BARRIER COATINGS TO METALS AND RESULTING PRODUCT

Ibrahim M. Allam, Menlo Park, and David J. Rowcliffe, Los Altos, both of Calif., assignors to S R I International, Menlo Park, Calif.

Continuation of Ser. No. 487,745, Apr. 22, 1984, abandoned, and a continuation-in-part of Ser. No. 662,252, Oct. 17, 1984, abandoned, and a continuation-in-part of Ser. No. 662,253, Oct. 17, 1984, and a continuation-in-part of Ser. No. 325,504, Nov. 27, 1981, Pat. No. 4,483,720. This application Apr. 4, 1985, Ser. No. 719,685
The portion of the term of this patent subsequent to Nov. 20, 2001, has been disclaimed.
Int. Cl.[4] C23C *8/10*
U.S. Cl. 148—6.3 **7 Claims**

1. A method of coating a metal substrate with a protective coating which comprises:

(a) providing a substrate metal to be coated,

(b) providing an alloy or mixture of (1) zirconium and/or hafnium, and (2) at least one other metal M_2 which does not form a stable oxide at an elevated temperature in an atmosphere having a very small partial pressure of oxy-

gen, and which forms an alloy with at least one component of the substrate on heat treatment of the coated material, the zirconium and/or hafnium constituting not less than 50% by weight of the alloy or mixture, M_2 being present in substantial amount but not exceeding 50% by weight of the alloy or mixture,

(c) applying such alloy or mixture to a surface of the substrate (1) by dipping the substrate in a molten alloy or mixture of zirconium and/or hafnium and M_2 or (2) by applying a slurry in a volatile liquid of zirconium and/or hafnium and M_2 in finely divided form either as the separate metals or as an alloy of the metals, then vaporizing the solvent and fusing the metals;

(d) effecting selective oxidation of the zirconium and/or hafnium at an elevated temperature in the coating without substantial oxidation of M_2,

(e) said method resulting in a coating which is bonded to the substrate, said coating having an outermost dense layer of zirconium and/or hafnium oxide substantially free from M_2, an intermediate layer containing zirconium and/or hafnium oxide and M_2 and an innermost layer of M_2 alloyed with one or more metals from the substrate.

4,715,903

ALUMINUM OFFSET COIL, AND METHOD FOR ITS PRODUCTION

Wolfgang V. Asten, Pulheim; Karl H. Dorner, Grevenbroich; Hartmut Scheel, Grevenbroich, and Volker Wurstle, Grevenbroich, all of Fed. Rep. of Germany, assignors to Vereinigte Aluminium-Werke Aktiengesellschaft, Fed. Rep. of Germany

Filed Mar. 3, 1986, Ser. No. 835,559

Claims priority, application Fed. Rep. of Germany, Mar. 2, 1985, 3507402

Int. Cl.⁴ C22F 1/04

U.S. Cl. 148—11.5 A **7 Claims**

5. A method of making an offset coil comprising:

hot-rolling an aluminum billet having a thickness between about 400 and about 600 mm at a temperature within the range between about 550° and about 480° C., thereby forming a coil having a recrystallized surface zone and an unrecrystallized core zone such that the coil after hot-rolling has a temperature above about 320° C. and has a hot-rolled thickness less than about 3.5 mm;

cooling said coil to room temperature;

cold rolling said coil without intermediate annealing to achieve a thickness reduction of about 80 to about 90% compared to the thickness of the hot rolled coil, such that said core zone has a grain aspect ratio S of at least 16 and said surface zone has a grain aspect ratio S of less than 8.

4,715,904

METHOD FOR PRODUCING A MAGNET WITH RADIAL MAGNETIC ANISOTROPY

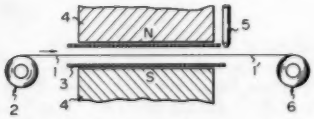
Kenzaburo Iijima, and Yoshinori Hayashi, both of Shizuoka, Japan, assignors to Nippon Gakki Seizo Kabushiki Kaisha, Japan

Filed Feb. 24, 1984, Ser. No. 583,125

Claims priority, application Japan, Feb. 28, 1983, 58-033425

Int. Cl.⁴ H01F 1/02

U.S. Cl. 148—102 **16 Claims**



1. A method for producing a magnet having radial magnetic anisotropy comprising the steps of

forming a thin, elongated strap from a Cu—Ni—Fe spinodal decomposition type alloy which can be provided with magnetic anisotropy,

subjecting said strap to age-hardening under concurrent magnetization in its thickness direction, and taking up said strap, after age-hardening, into a light, hollow roll of a prescribed shape.

2. A method for producing a magnet having radial magnetic anisotropy comprising the steps of

forming a thin, elongated strap from a Fe—Cr—Co spinodal decomposition type alloy which can be provided with magnetic anisotropy,

subjecting said strap to age-hardening under concurrent magnetization in its thickness direction, and taking up said strap, after age-hardening, into a tight, hollow roll of a prescribed shape,

subjecting said roll of said strap to additional age-hardening.

4,715,905

METHOD OF PRODUCTING THIN SHEET OF HIGH SI-FE ALLOY

Kazuhide Nakaoka, Yokohama; Yoshikazu Takada, Kawasaki; Junichi Inagaki, and Akira Hiura, both of Yokohama, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

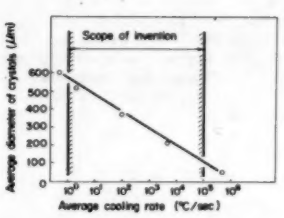
PCT No. PCT/JP85/00534, § 371 Date Feb. 10, 1986, § 102(e) Date Feb. 10, 1986, PCT Pub. No. WO86/02102, PCT Pub. Date Apr. 10, 1986

PCT Filed Sep. 26, 1985, Ser. No. 833,394

Claims priority, application Japan, Sep. 28, 1984, 59-201594

Int. Cl.⁴ H01F 1/04

U.S. Cl. 148—111 **10 Claims**



1. A method of producing thin sheets of Si-Fe alloy, comprising the steps of

preparing molten Si-Fe alloy composition containing more than 4.0 weight percent Silicon;

casting the molten Si-Fe alloy to form plates of thickness ranging from 0.1 mm to 30 mm and cooling at a cooling rate of 1° C./sec to less than 10^5° C./sec, said casting being by thin plate casting;

subsequently hot rolling the cast plates at a reduction rate of more than 30 percent and at a temperature of between 600° C. and 800° C.; and

subsequently pickling, cold rolling and annealing.

4,715,906

ISOTHERMAL HOLD METHOD OF HOT WORKING OF AMORPHOUS ALLOYS

Alan I. Taub, Schenectady, and Peter G. Frischmann, Scotia, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Mar. 13, 1986, Ser. No. 839,317

The portion of the term of this patent subsequent to Apr. 22, 2003, has been disclaimed.

Int. Cl.⁴ H01F 1/00

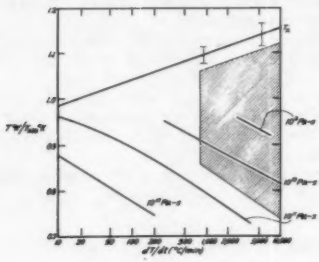
U.S. Cl. 148—120 **10 Claims**

1. A method of deforming an amorphous alloy without destroying its magnetic properties which comprises

providing an amorphous alloy specimen,

ramping the temperature of the specimen at a rate at or above 1000° C./min which preserves its viscosity at a low value of less than 4×10^{11} Pa-S,

heating the specimen to above its softening temperature and below its recrystallization temperature,



stressing the specimen to deform the specimen at or below its yield strength after the temperature has been ramped to above its softening temperature.

4,715,907

METHOD FOR HEAT TREATING FERROUS PARTS

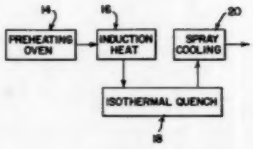
George D. Pfaffmann, Farmington, Mich., assignor to Tocco, Inc., Boaz, Ala.

Division of Ser. No. 752,550, Jul. 8, 1985, Pat. No. 4,637,844. This application Aug. 22, 1986, Ser. No. 899,323

The portion of the term of this patent subsequent to Jan. 20, 2004, has been disclaimed.

Int. Cl.[4] C21D *11/20*

U.S. Cl. 148—144 **3 Claims**



1. A method of heat treating ferrous workpieces comprising:

inductively heating a peripheral surface portion of the workpiece to the austenizing temperature thereof to a substantial depth while leaving the remaining core portion of the workpiece substantially below said austenizing temperature;

rapidly cooling the inductively heated peripheral surface portions of the workpiece in a bath to a predetermined transformation temperature which is above the M_s temperature of the workpiece at a rate at least equal to the critical cooling rate and sufficiently rapid to prevent transformation of the austenite of the austenized peripheral surface portions to intermediate matrix phases during the said rapid cooling thereof;

maintaining the said workpiece at the said predetermined transformation temperature for a preselected time sufficient to substantially homogenize only said surface portion of said workpiece at said transformation temperature and independently of the temperature of said core portion; and

then cooling the workpiece to ambient temperature.

4,715,908

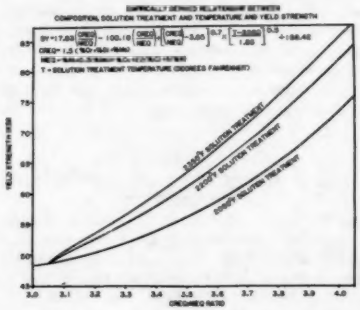
DUPLEX STAINLESS STEEL PRODUCT WITH IMPROVED MECHANICAL PROPERTIES

Robin K. Churchill, Aloha, Oreg., assignor to ESCO Corporation, Portland, Oreg.

Continuation-in-part of Ser. No. 801,746, Nov. 26, 1985, abandoned. This application May 19, 1986, Ser. No. 864,333

Int. Cl.[4] C22C *38/44*

U.S. Cl. 148—327 **1 Claim**



1. A duplex stainless steel having austenite pools in a ferrite matrix resulting from heating to a temperature in the range of 2050° F.–2350° F. and cooling rapidly thereafter, said steel consisting essentially of except for residual elements:

Carbon	0.001	to	0.08	Wt. %
Manganese	0.001	to	2.00	Wt. %
Silicon	0.001	to	1.50	Wt. %
Chromium	20.00	to	27.50	Wt. %
Nickel	8.00	to	11.00	Wt. %
Molybdenum	3.00	to	4.50	Wt. %
Sulfur	0.0001	to	0.050	Wt. %
Phosphorus	0.0001	to	0.050	Wt. %
Nitrogen	0.10	to	0.30	Wt. %
Iron	Balance			

such that:

$$3.50 \leqq \left(\frac{Creq}{Nieq}\right) \leqq 4.00$$

where:

Creq=1.5(% Cr+% Si+% Mo)

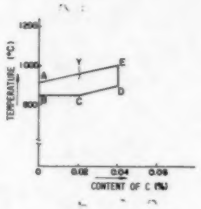
Nieq=% Ni+0.3(% Mn)+% Cu+22(% C)+5% N

and having greater impact toughness values in the cast form than Ferralium Alloy 255 and SAF 2205, the impact toughness in Charpy V-notch testing at −100° F. being above about 75 ft-lbs. when tested from keel blocks per ASTM E23-82, the HAZ impact toughness at −100° F. being above about 50 ft-lbs. and having a yield strength of at least 65 KSI.

4,715,909
NICKEL-CHROMIUM ALLOY IN STRESS CORROSION CRACKING RESISTANCE

Takao Minami, Amagasakishi; Hiroo Nagano, Kobeshi; Kazuo Yamanaka, Minooshi; Yasutaka Okada, Narashi; Hiroshi Susukida, Takasago; Kichiro Onimura, Takasago; Toshio Yonezawa, Takasago, and Nobuya Sasaguri, Takasago, all of Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo and Sumitomo Metal Industries, Ltd., Osaka, both of Japan

Continuation of Ser. No. 550,023, Nov. 8, 1983, abandoned. This application Jun. 19, 1986, Ser. No. 878,398
Claims priority, application Japan, Jun. 13, 1983, 58-104094; Jun. 13, 1983, 58-104095
Int. Cl.[4] C22C *19/05*
U.S. Cl. 148—410 2 Claims



1. A nickel-chromium alloy heat treated product excellet in a stress corrosion cracking resistance which is obtained by carrying out an annealing treatment under conditions defined by points A,B,C,D and E of FIG. 1, said alloy consisting essentially of the following composition:

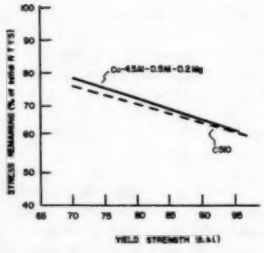
in terms of % by weight,	
not more than 0.04% C;	not more than 1.0% Si;
not more than 1.0% Mn;	not more than 0.030% P;
not more than 0.02% S;	40 to 70% Ni;
25 to 35% Cr;	0.1 to 0.5% Al;
0.05 to 1.0% of Ti;	

0.5 to 5.0% of a metal selected from the group consisting of Mo, W, V and mixtures thereof; and balance Fe.

4,715,910
LOW COST CONNECTOR ALLOY

Frank N. Mandigo, Northford, and Eugene Shapiro, Hamden, both of Conn., assignors to Olin Corporation, New Haven, Conn.

Filed Jul. 7, 1986, Ser. No. 882,878
Int. Cl.[4] C22C *9/01*
U.S. Cl. 148—414 17 Claims

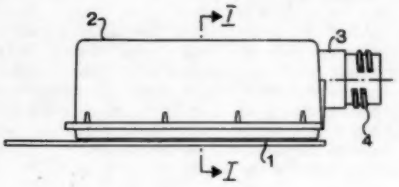


15. An electrical connector formed from a copper base alloy consisting essentially of from about 3.5% to about 6.0% aluminum, from about 0.1% to about 3.0% nickel, from about 0.03% to about 1.0% magnesium and the balance essentially copper.

4,715,911
METHOD FOR THE PRODUCTION OF A PLASTIC CONTAINER

Arne Johansson, Roskilde, and Erland Namensen, Lejre, both of Denmark, assignors to A/S Nunc, Roskilde, Denmark

Filed Mar. 25, 1986, Ser. No. 843,685
Claims priority, application Denmark, Mar. 25, 1985, 1345/85
Int. Cl.[4] B32B *31/20*
U.S. Cl. 156—69 6 Claims



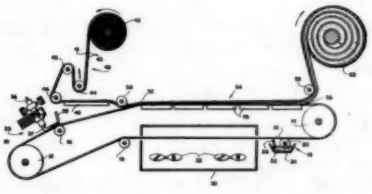
1. A method of producing a plastic container which includes a base part and an integral top part, the base part and the integral top part being easily separated, said method comprising the steps of

(a) providing a plastic and essentially planar base part,
(b) providing a plastic top part which defines at least one compartment therein and an open end, said top part having an essentially planar end face at said open end and a thin flange which projects outwardly from around the entire periphery of said end face,
(c) positioning said top part and said base part together so that said thin flange of said top part contacts said base,
(d) vibrating one of said top part and said base part relative to the other part to partially melt said thin flange,
(e) discontinuing said vibrating before said thin flange becomes completely molten, and
(f) allowing said flange to cool, such that said top and base parts become attached, thereby producing said plastic container.

4,715,912
METHOD FOR FORMING A LAYER OF BLOWN CELLULAR URETHANE ON A CARPET BACKING

John G. Tillotson, Tiarco Dr., Dalton, Ga. 30720

Continuation of Ser. No. 718,899, Apr. 2, 1985, abandoned, which is a continuation of Ser. No. 531,282, Sep. 12, 1983, Pat. No. 4,512,831, which is a continuation of Ser. No. 000,478, Jan. 2, 1879, Pat. No. 4,405,393, which is a continuation of Ser. No. 872,341, Jan. 25, 1978, Pat. No. 4,132,817, which is a continuation-in-part of Ser. No. 782,636, Mar. 30, 1977, Pat. No. 4,171,395. This application May 21, 1986, Ser. No. 870,283
The portion of the term of this patent subsequent to Jan. 2, 1996, has been disclaimed.
Int. Cl.[4] B32B *31/00, 5/20*
U.S. Cl. 156—79 10 Claims



1. Method of producing a continuous layer of chemically blown foam cushion having a density of between approximately one and ten pounds per cubic foot on the back of a carpet product comprising the steps of:

(a) preparing a mixture of reactive urethane forming agents, including isocyanate, polyol and water such that said mixture will undergo chemical blowing when heated sufficiently, and controlling the temperature of said mixture to a temperature of between approximately 60° and 100° F.;
(b) providing a conveyor path;
(c) depositing said mixture onto an elastomeric film moving along said conveyor path;
(d) forming said mixture on said film into a uniform layer by means of an air knife;
(e) preheating the lower surface of an uncoated carpet material to a temperature of approximately 100° to 300° F.;
(f) bringing the lower surface of said preheated carpet into flush contact with said layer of said mixture on said film;
(g) heating said mixture to cause chemical blowing thereof;
(h) applying pressure to said layer of said mixture disposed between said carpet and said film; and
(i) removing the coated carpet material from said conveyor path.

4,715,913

DECORATING SUBSTRATE MATERIALS

Nicholas J. Middleton, Highworth, England, assignor to Metal Box p.l.c., Reading, England

Continuation of Ser. No. 619,175, Jun. 11, 1984, abandoned. This application Apr. 24, 1986, Ser. No. 858,556
Claims priority, application United Kingdom, Jun. 13, 1984, 8316092
Int. Cl.[4] B32B *31/00*; B44C *1/17*; D06P *1/02*
U.S. Cl. 156—85 **26 Claims**

1. A method of decorating a side wall of a container body comprising the steps of
(a) providing a container body having a side wall including an exterior surface,
(b) providing a base coating laminate including a layer of polyester film and a layer of heat-sensitive adhesive,
(c) providing a flexible paper carrier printed with indicia in a sublimable dye,
(d) first applying the base coating laminate to the container body side wall exterior surface with the adhesive thereof in contact with the container body exterior surface,
(e) heating the heat-sensitive adhesive to activate the heat-sensitive adhesive and bond the polyester film of the base coating laminate to the container body,
(f) following step (e) applying the flexible paper carrier with the sublimable dye against the layer of the polyester film in such a position as to effect the migration of the dye from the carrier directly to the layer of polyester film,
(g) heating the paper carrier in order (1) to effect shrinkage of the paper carrier to tighten it into intimate contact with the polyester, and (2) to effect the migration of the sublimable dye and indicia from the paper carrier to the layer of polyester film, and then
(h) removing the paper carrier from the layer of polyester film.

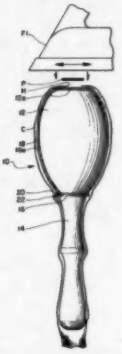
4,715,914

FABRIC REPAIR IMPLEMENT AND METHOD OF MENDING HOLES IN FABRICS

Loraine Viner, 1066 S. Ogden Dr., Los Angeles, Calif. 90019

Filed Mar. 23, 1987, Ser. No. 28,725
Int. Cl.[4] B32B *35/00*
U.S. Cl. 156—94 **13 Claims**

13. A method for the repair of wear holes and tears in fabric apparel items comprising:
(a) turning the fabric apparel item requiring hole repair inside-out to expose the inner side of said apparel item;
(b) positioning the fabric apparel item in the area of the hole requiring repair over a hand-held mandrel having a flattened anvil surface area at its upper head end, said mandrel having a fabric heat-resistant cover bearing on its outer surface a Teflon coating for interface with said apparel item;
(c) positioning a hole patch pre-form of fabric material bearing a heat activated adhesive coating on one side thereof over the apparel item in the area of the hole requiring repair, the adhesive coating of said patch pre-form interfacing with said apparel item and exposed portions of the fabric heat-resistant cover of said mandrel;
(d) heating the hole patch pre-form of fabric material and



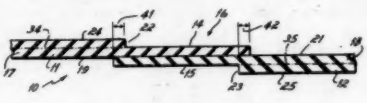
interfacing apparel item with a hand-held, heated ironing device applying pressure to said patch pre-form and apparel item in opposition to the hand-held mandrel and the upper flattened anvil surface area thereof to join said patch pre-form to said apparel item in the area thereof requiring hole repair; and
(e) removing said hand-held, heated ironing device and allowing the fabric material of said patch pre-form and said apparel item to cool to set said heat activated adhesive and thereby repair said apparel item.

4,715,915

LONGITUDINAL SEAM AND METHOD OF FORMING

Robert S. Vanderzee, Carlisle, Pa., assignor to Carlisle Corporation, Cincinnati, Ohio

Filed Jun. 19, 1986, Ser. No. 875,943
Int. Cl.[4] B32B *31/00*
U.S. Cl. 156—182 **13 Claims**



1. A method of forming an enlarged sheet of material comprising;
forming a first sheet by bonding together a first and a second lamina with said first lamina extending beyond said second lamina along a longitudinal first edge to form an edge portion, a body portion, a first planar side and a first stepped side said body portion having a thickness greater than a thickness of said edge portion;
forming a second sheet by bonding together a first and a second lamina with said first lamina extending beyond said second lamina along a longitudinal second edge of said second lamina to form an edge portion, a body portion, a second planar side, and a second stepped side;
bonding said first edge portion of said first sheet to said second edge portion of said second sheet with said first planar surface positioned and bonded to said second planar surface thereby forming a seam;
said first and second edge portions overlapped to a con-

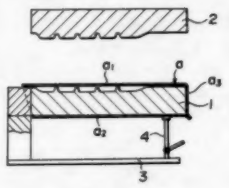
trolled degree to provide a seam having a greatest thickness 1½ times the thickness of said body portion of said first sheet.

4,715,916

METHOD FOR ASSEMBLING A SEAT BACK

Makoto Shimada, Akishima, Japan, assignor to Tachikawa Spring Co., Ltd., Tokyo, Japan

Filed Sep. 20, 1985, Ser. No. 778,259
Claims priority, application Japan, Sep. 25, 1984, 59-200893
Int. Cl.⁴ B29B *43/04*
U.S. Cl. 156—245 **3 Claims**



1. A method of assembling a seat back, comprising the steps of:

forming a bag-like trim cover assembly by sewing at least a cover portion defining front and lateral side portions of the seat back to a cover portion defining a back portion of the seat back;

mounting said bag-like trim cover assembly, inside out, onto a cantileverwise supported lower mold in an inserted manner, said lower mold being provided on the upper surface thereof with an uneven configuration corresponding to a desired front surface of the seat back;

pressing an upper mold having on the engagement surface thereof an uneven configuration corresponding to said uneven configuration of said lower mold onto said trim cover assembly so as to form an uneven surface on said trim cover assembly;

applying an adhesive agent to said uneven surface of said trim cover assembly;

pressing a foam cushion member with a frame embedded therein against said trim cover assembly while said trim cover assembly is mounted on said lower mold, to thereby bond said cushion member to said trim cover assembly; and

turning over the portions of said trim cover assembly which are disposed on the lower surface side of said lower mold so that said portions cover said cushion member.

4,715,917

PROCESS FOR THE PRODUCTION OF A MULTIDETECTOR WITH IONIZATION CHAMBERS

Marco Tirelli, Palaiseau; René Lecolant, Etampes, and Raoul Hecquet, Boulogne, all of France, assignors to Thomson-CGR, Paris, France

Filed Dec. 11, 1985, Ser. No. 807,732
Claims priority, application France, Dec. 14, 1984, 84 19188
Int. Cl.⁴ B32B *31/18*
U.S. Cl. 156—250 **10 Claims**

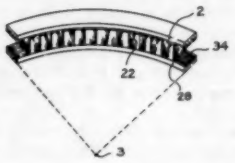
1. A process for the production of a multidetector having ionization chambers and metallized partitions wherein each of said metallized partitions has a plurality of flanges, comprising the steps of:

cutting, in a resin monoblock, a base having the same shape as the multidetector to be produced;

arrranging said partitions in a tool shaped so that said flanges of said partitions extend from said tool;

spreading onto said base a resin which is to be polymerized;

moving said tool close to said base;



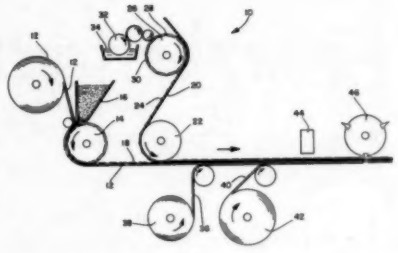
polymerizing said resin while maintaining said tool close to said base so that said partitions which are immersed in said resin are welded to said base.

4,715,918

METHOD FOR FORMING DISCRETE PARTICULATE AREAS IN A COMPOSITE ARTICLE

Theodore B. Lang, Appleton, Wis., assignor to Kimberly-Clark Corporation, Neenah, Wis.

Filed Jun. 26, 1985, Ser. No. 749,158
Int. Cl.⁴ B32B *31/06, 31/08, 31/12*
U.S. Cl. 156—273.1 **14 Claims**



1. A method of forming a composite structure comprising laying down discrete areas of particulate material on a receiving web, applying adhesive to areas of a covering web, bringing the two webs together, in such a manner that the adhesive areas do not overlay the discrete areas of said particulate material, thereby creating discrete pockets of particulate material wherein said particulate material is laid down in discrete areas by being applied to depressions in a forming roll that is then rotated into contact with the receiving web and wherein said discrete areas of particulate material are in a pattern having a greater number of said depressions in the areas of the roll where more particulate material is desired and wherein said laying down on said receiving web is by electrical attraction.

4,715,919

INTERFACIAL BONDING OF POLYMERIC LAMINAE IN THE SOLID STATE

Stoyko C. Fakirov, Sofia, Bulgaria, and Jerold M. Schultz, Newark, Del., assignors to University of Delaware, Newark, Del.

Continuation of Ser. No. 553,106, Nov. 18, 1983, abandoned. This application Sep. 20, 1985, Ser. No. 777,991
Int. Cl.⁴ C09J *5/02, 1/00, 3/00*
U.S. Cl. 156—307.3 **9 Claims**

1. A process for production of a bonded laminar structure of crystalline, oriented linear polyester laminae, the laminae being of a composition which loses its crystallinity and orientation upon melting, the bonds being chemical bonds formed by solid state reaction between molecules of each lamina across the

interface of contacting surfaces of laminae by the steps in sequence comprising:

application to at least one of two adjacent surfaces to be bonded of an agent effective in the absence of externally applied radiation to cause chemical reaction between molecules of polymers of adjacent laminae;

bringing the surfaces having said agent on at least one surface to be bonded together to form a laminate;

urging the surfaces to be bonded into intimate contact with pressure; and

heating the laminate while being urged into contact to a temperature from 10° to 100° C. below the melting point of the polyester of the laminate to form chemical bonds.

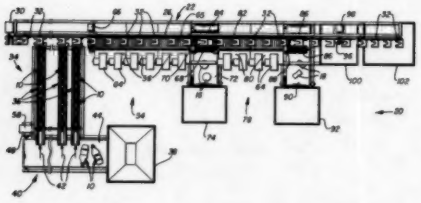
4,715,920
APPARATUS AND METHOD FOR RECYCLING PLASTIC BEVERAGE CONTAINERS

Kurt H. Ruppman, Dallas, and Charles A. Prano, Richardson, both of Tex., assignors to Plastic Recycling Inc., Tex.

Continuation of Ser. No. 161,883, Jun. 23, 1980, abandoned. This application Apr. 2, 1982, Ser. No. 364,636

Int. Cl.[4] B32B *31/18*

U.S. Cl. 156—344 **44 Claims**



1. Apparatus for separating labels adhesively secured to plastic bottles, comprising:

an endless belt mounted for rotation around a course;

means for effecting rotation of said belt;

a plurality of carriers secured to said belt for movement therewith, each of said carriers comprising a single piece flat plate with a notch therein oriented toward the travel direction of said belt, the notch being configured to engage the neck of a bottle;

means located along the course for heating said bottles to soften the adhesive securing the labels thereto;

means located along the course beyond said heating means for separating the labels from said bottles and collecting the labels; and

a portion of the course followed by said belt being angled so that each bottle slides out of the notch of its corresponding carrier under gravity.

22. A method of separating labels and base cups adhesively secured to plastic bottles, comprising the steps of:

(a) advancing the bottles along a predetermined course;

(b) heating the bottles to soften the adhesive securing the labels and base cups thereto;

(c) contacting the heated bottles with a pair of rotating brushes positioned to engage opposite sides of each bottle to remove the base cups therefrom;

(d) collecting the removed base cups;

(e) contacting the heated bottle with a pair of rotating brushes positioned to engage opposite sides of each bottle to remove the labels therefrom;

(f) collecting the removed labels; and

(g) collecting the bottles.

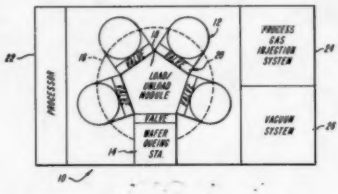
4,715,921
QUAD PROCESSOR

Joseph A. Maher, South Hamilton, Mass.; E. John Vowles, Goffstown; Joseph D. Napoli, Winham, both of N.H.; Arthur W. Zafiropoulo, Manchester, and Mark W. Miller, Burlington, both of Mass., assignors to General Signal Corporation, Stamford, Conn.

Filed Oct. 24, 1986, Ser. No. 923,125

Int. Cl.[4] H01L *21/306;* **B44C** *1/22*

U.S. Cl. 156—345 **25 Claims**



1. A multiple-processing and contamination-free plasma etching system, comprising:

plural, single-wafer plasma etching vessels each having an ingress and egress defining port that are arrayed about a predetermined spacial locus in such a way that the several ports thereof are accessible form a single location spaced from the several ports;

a wafer queuing station spaced with the plural vessels along the same predetermined spacial locus defining a wafer access port accessible from said single location;

plural valve means individually coupled to corresponding ones of said plural, single-wafer plasma etching vessel ingress and egress ports and to said wafer queuing station wafer access port;

single-wafer transfer means disposed at said single location and cooperative with corresponding ones of said plural valve means for moving wafers from and to said wafer access port of said queuing station from and to selected ones of said single-wafer plasma etching vessels through the associated one of said ingress and egress ports thereof; and

processor means for controlling said vessels, said transfer means and said valve means to provide selectable single or multistep processing of wafers in said queuing station in one or more of said etching vessels.

4,715,922
AUTOMATIC PAPER ROLL PASTING APPARATUS FOR ROTARY PRESSES

Mamoru Hayashi, Kawasaki, and Hideo Kawamori, Yokohama, both of Japan, assignors to Tokyo Kikai Seisakusho, Ltd., Japan

Filed Mar. 31, 1986, Ser. No. 846,601

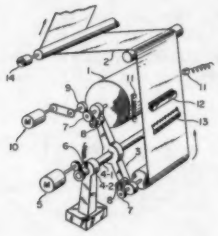
Claims priority, application Japan, Mar. 30, 1985, 60-66742

Int. Cl.[4] B65H *19/16, 19/18, 19/20*

U.S. Cl. 156—361 **4 Claims**

1. An automatic paper roll pasting apparatus for rotary presses for sequentially and continually feeding a continuous strip of paper, or a paper web, to a rotary press from a plurality of paper rolls, and characterized in that a paper roll support capable of accommodating at least two or more paper rolls, a paper roll measuring means for measuring a value relating to the diameter of a new paper roll mounted on said paper roll support, and a paper roll revolution control means for calculating a signal in the form of a revolution signal by correlating said value relating to the diameter of said new paper roll measured by said paper roll measuring means with the speed of a running paper web being fed to said rotary press from another paper roll mounted on said paper roll support to control the revolution of said new paper roll by comparing said calculated

revolution signal with said revolution signal of said new paper roll are provided; and that said paper roll revolution control means is adapted to coincide the revolution of said new paper



roll with desired revolution of said new paper roll calculated from the speed of said running paper web, and said new paper roll is pasted, by pasting with adhesive, for example, with said paper web.

4,715,923

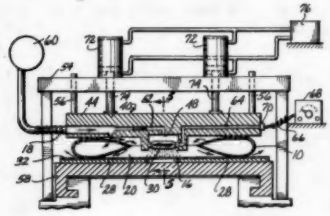
APPARATUS FOR CONSOLIDATING COMPOSITE MATERIALS

Frederick L. Knoll, Kent, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Dec. 26, 1985, Ser. No. 813,645

Int. Cl.[4] B32B *31/26*

U.S. Cl. 156—380.9 **19 Claims**



1. Apparatus for consolidating materials on a work surface, comprising:

a fluid bearing having a flexible, inflatable cushion, said cushion forming a plenum chamber when inflated;

means for inflating said cushion and pressurizing said plenum chamber with fluid to float said fluid bearing in proximate relationship to a work surface and material to be consolidated thereon;

means for applying a load to said fluid bearing so as to develop a predetermined pressure in said plenum chamber;

positioning means for positioning said fluid bearing so that said inflatable cushion is spaced from said material and said plenum chamber is superposed relative to said material and said work surface to apply the pressure in said plenum chamber to said material; and

heating means for heating said material while the pressure in said plenum chamber is applied thereto.

4,715,924

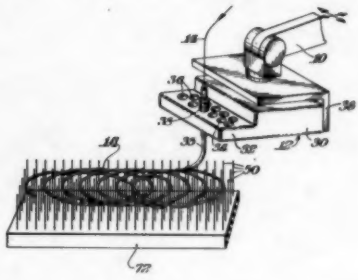
APPARATUS FOR FORMING A WEB

Ronald F. McConnell, West Chester, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Nov. 29, 1982, Ser. No. 445,166

Int. Cl.[4] D04H *3/02*

U.S. Cl. 156—433 **7 Claims**



1. An apparatus comprising a bed of resiliently mounted, deflectible pins and a movable head for depositing a continuous strand in said bed according to a desired pattern, said head including a freely rotatable, strand-guiding tube projecting therefrom and terminating in a horn, said horn being a curved length projecting into said bed sufficiently to dispense the strand beneath the tops of the pins.

4,715,925

APPARATUS FOR FORMING CONNECTION BRIDGES BETWEEN STACKS OF CORRUGATED CARDBOARD SHEETS IN A CORRUGATOR

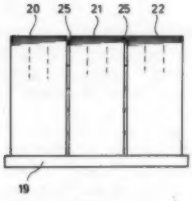
Walter Hofmeister, Henstedt-Ulzburg, and Günter Demmin, Hamburg, both of Fed. Rep. of Germany, assignors to Peters Maschinenfabrik GmbH, Fed. Rep. of Germany

Filed Feb. 13, 1987, Ser. No. 14,349

Claims priority, application Fed. Rep. of Germany, Feb. 15, 1986, 3604870

Int. Cl.[4] B31F *1/00*

U.S. Cl. 156—470 **3 Claims**



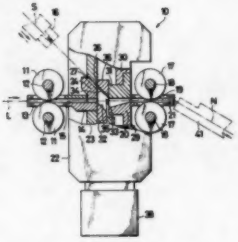
1. Apparatus for stacking of corrugated cardboard sheets on at least two stacks disposed adjacent each other in a stacker included in a corrugator, wherein a slitter scorer, first conveying means, cut-off means, second conveying means and a stacker are located each behind the other in conveying direction, characterized in that at least one applying means is located above the first conveying means, said applying means being supported for movement transverse to the conveying direction and said applying means being adapted to apply adhesive strips, self-adhering paper strips or the like to adjacent webs to form connection bridges between the stacks by which adjacent stacks are stabilized against each other.

4,715,926

APPARATUS FOR SEVERING AND JOINING JOINT PIECE

Ryuichi Murasaki, Toyama, Japan, assignor to Yoshida Kogyo K. K., Tokyo, Japan

Filed Oct. 24, 1986, Ser. No. 922,724
Claims priority, application Japan, Oct. 26, 1985, 60-240217
Int. Cl.[4] B32B *31/18, 31/20*
U.S. Cl. 156—511 **7 Claims**



1. An apparatus for severing and joining a joint piece, comprising:
   (a) first feed means for feeding a first elongate product for a predetermined interval along a substantially horizontal path;
   (b) second feed means for feeding a second elongate product for a predetermined interval along an inclined path extending obliquely to said horizontal path;
   (c) a first fixed cutter disposed ajacent to said horizontal path;
   (d) a second fixed cutter disposed adjacent to said inclined path;
   (e) a movable cutter movable for tranversely cutting off the first elongate product on said first fixed cutter into a product length and then for obliquely cutting off the second elongate product on said second fixed cutter into a joint piece, said movable cutter having a slanted surface for carrying a trailing end of the product length thereon with the joint piece partly overlapping said trailing end; and
   (f) joining means for joining overlapping portions of the joint piece and the product length to each other, thereby to produce a product with the joint piece having a free end exposed beyond said trailing end.

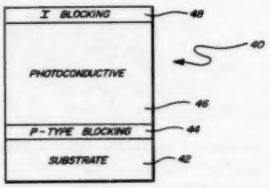
4,715,927

IMPROVED METHOD OF MAKING A PHOTOCONDUCTIVE MEMBER

Annette G. Johncock, Walled Lake, and Stephen J. Hudgens, Southfield, both of Mich., assignors to Energy Conversion Devices, Inc., Troy, Mich.

Continuation of Ser. No. 580,081, Feb. 14, 1984, abandoned.
This application Nov. 21, 1986, Ser. No. 941,244
The portion of the term of this patent subsequent to May 14, 2002, has been disclaimed.
Int. Cl.[4] C30B *25/02*
U.S. Cl. 156—606 **48 Claims**

1. An improved method of forming a photoconductive member, comprising:
   providing a substrate;
   providing a source of microwave energy;
   providing an enclosed reaction vessel;
   operatively disposing said substrate in said vessel;
   coupling microwave energy from said source into the interior of said vessel;
   introducing into said vessel at least one reaction gas, said reaction gas including at least one semiconductor element to be deposited;
   energizing said source of microwave energy to generate a plasma in said vessel and to deposit semiconductor alloy material from said reaction gas onto said substrate;
   evacuating said vessel to an operating pressure about an order of magnitude below conventional RF deposition pressure;
   depositing a bottom blocking layer onto said substrate by adding at least one dopant to said reaction gas;
   depositing a substantially intrinsic, amorphous photoconductive layer onto said blocking layer said photoconductive layer having a first density of defect states;
   changing at least one deposition parameter so as to deposit an enhancement layer atop said photoconductive layer, said enhancement layer having a second density of defect states less than said first density of defect states; and
   depositing a hard top stabilizing layer atop said enhancement layer, said hard top stabilizing layer formed from a reaction gas which includes at least one of carbon, nitrogen or oxygen.

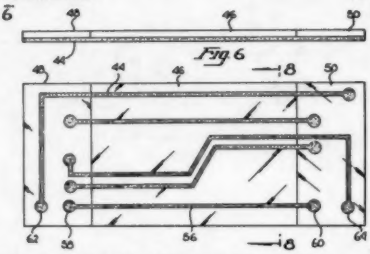


4,715,928

FLEXIBLE PRINTED CIRCUITS AND METHODS OF FABRICATING AND FORMING PLATED THRU-HOLES THEREIN

Bill L. Hamby, 1198 Navigator Dr., Ventura, Calif. 93003

Division of Ser. No. 780,806, Sep. 27, 1985, Pat. No. 4,687,695.
This application Sep. 19, 1986, Ser. No. 909,315
Int. Cl.[4] C23F *1/02;* **B44C** *1/22;* **C03C** *15/00, 25/06*
U.S. Cl. 156—630 **15 Claims**



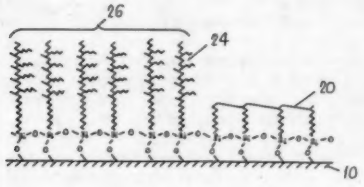
1. A method of making flexible printed circuits comprising the steps of
   (a) providing a sheet of metal,
   (b) covering at least a first area of the metal sheet with a sheet of flexible material,
   (c) covering a second area of the metal sheet at least in part coterminous with the first area with a rigid printed circuit board material,
   (d) bonding the flexible material and the rigid material to the metal sheet,
   (e) etching the metal sheet to form a circuit pattern and
   (f) bonding additional flexible material and rigid printed circuit board to the flexible material and rigid printed circuit board material, respectfully, of steps (b) and (c) to sandwich the circuit pattern formed in step (e) therebetween.

4,715,929

PATTERN FORMING METHOD

Kazufumi Ogawa, Hirakata, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jul. 15, 1986, Ser. No. 885,824
Claims priority, application Japan, Jul. 19, 1985, 60-160507
Int. Cl.[4] B44C 1/22; B05D 3/06
U.S. Cl. 156—643 10 Claims



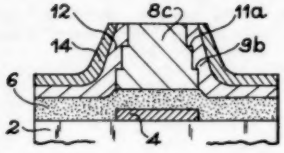
1. A pattern forming method comprising the steps of:
forming on a substrate a monomolecular film having responsive groups which undergo chemical vapor reactions under irradiation of an energy beam;
irradiating an energy beam in a pattern on said monomolecular film, thereby forming bonds between said responsive groups at the irradiated portion to selectively deactivate the responsive groups in the irradiated portion;
transferring said substrate into a polymerizing monomer atmosphere; and
irradiating the entire surface of said monomolecular film in said monomer atmosphere to activate the responsive groups in a pattern not deactivated and additionally polymerize said monomer onto the monomolecular film except in the previously deactivated portion,
whereby a polymerized film is formed in a pattern.

4,715,930

PROCESS FOR PRODUCING BY SLOPING ETCHING A THIN FILM TRANSISTOR WITH A SELF-ALIGNED GATE WITH RESPECT TO THE DRAIN AND SOURCE THEREOF

Bernard Diem, Meylan, France, assignor to Commissariat a l'Energie Atomique, Paris, France

Filed Nov. 13, 1986, Ser. No. 929,908
Claims priority, application France, Nov. 15, 1985, 85 16922
Int. Cl.[4] H01L 21/306; B44C 1/22; C03C 15/00, 25/06
U.S. Cl. 437—101 2 Claims



1. A process for producing a thin film transistor with a self-aligned gate with respect to its drain and source comprising the following successive steps:
(a) producing the transistor gate on a glass substrate;
(b) depositing an insulating layer on the substrate and the gate;
(c) depositing a thick hydrogenated amorphous silicon layer on the insulating layer;
(d) depsiting a positive photosensitive resin layer on the silicon layer;
(e) irradiating the resin layer through the substrate, the gate serving as an irradiation mask;
(f) developing the resin layer leading to the elimination of the irradiated zones of said resin layer;
(g) etching the silicon layer until the insulating layer is exposed, the remaining resin serving as a mask for said etching;
(h) producing electric contacts and source and drain electrodes of the transistor; and
(i) eliminating the remaining resin and forming a plurality of staircase steps on the edges of the silicon layer by an equal number of successive and partial etching operations of said silicon layer, the remaining resin being used on each occasion as a mask and itself being etched isotropically over a limited thickness following each etching of the silicon layer.

4,715,931

PROCESS FOR INHIBITING ALUMINUM HYDROXIDE DEPOSITION IN PAPERMAKING FELTS

Alan J. Schellhamer; Daniel J. Barnett, and Abdul Q. Khan, all of Jacksonville, Fla., assignors to Betz Laboratories, Inc., Trevose, Pa.

Filed Mar. 24, 1987, Ser. No. 29,827
Int. Cl.[4] D21F 1/32
U.S. Cl. 162—199 18 Claims

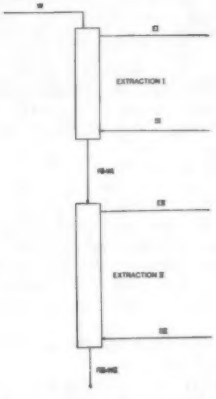
16. In a process for conditioning of press felt in a papermaking system producing paper or paperboard from pulp suspensions containing alum wherein aluminum hydroxide is deposited in said felt and a surfactant is added to the shower water to inhibit felt filling and compaction, the improvement comprising adding to said water a carboxylic acid selected from the group consisting of tartaric acid, malic acid, citric acid, mesoxalic acid, tartronic acid and tetrahydroxy succinic acid, said carboxylic acid being added in an amount from 10 parts to 1,000 parts per million parts of water.

4,715,932

METHOD TO SEPARATE POLAR ORGANIC COMPOUNDS, IN PARTICULAR ALIPHATIC ALCOHOLS, FROM FERMENTATION FLUIDS

Klaus Misselhorn, Ascheberger Weg 41, 1000 Berlin 27, and Uwe Tegtmeier, Triftstrasse 46, 1000 Berlin 65, both of Fed. Rep. of Germany

Filed Mar. 23, 1982, Ser. No. 361,069
Claims priority, application Fed. Rep. of Germany, Mar. 30, 1981, 3112603
Int. Cl.[4] B01D 3/34; C07C 29/86
U.S. Cl. 203—43 12 Claims



1. Method for the separation of polar organic compounds from aqueous fermentation fluids which comprises:
(a) extracting at least part of said fermentation fluid from a

fermentation process with a first solvent (SI) which is a selective extractant for said polar organic compounds to form a first extract phase (EI) comprising first solvent (SI) and extracted polar organic compounds and a first raffinate phase (RI) comprising the remaining aqueous fermentation fluid and some solvent (SI);

(b) separating said first extract phase (EI) from said first raffinate phase (RI);

(c) recovering said polar organic compounds from the said first extract phase (EI);

(d) extracting said first raffinate phase (RI) with a second solvent (SII) which is a selective solvent for the first solvent (SI) and which has a different polarity than solvent (SI) to form a second extract phase (EII) comprising first solvent (SI) and second solvent (SII), a second raffinate phase (RII) substaltially free from said solvent (SI), solvent (SII) and said polar organic compounds.

(e) separating said second extract phase (EII) from said second raffinate phase (RII).

4,715,933

SEPARATION OF N-PROPANOL FROM 2-BUTANOL BY EXTRACTIVE DISTILLATION

Lloyd Berg, and Mark G. Vosburgh, both of 1314 S. Third Ave., both of Bozeman, Mont. 59715

Filed Sep. 16, 1985, Ser. No. 776,450
Int. Cl.[4] B01D *3/40*; C07C *29/84*
U.S. Cl. 203—51 **3 Claims**

1. A method for recovering n-propanol from a mixture of n-propanol and 2-butanol which comprises distilling a mixture of n-propanol and 2-butanol in a rectification column in the presence of about one to two parts of extractive agent per part of n-propanol-2-butanol mixture, recovering n-propanol as overhead product, obtaining the 2-butanol and the extractive agent from the stillpot, separating the 2-butanol from the extractive agent by conventional distillation in another rectification column, wherein said extractive agent

(1) is an organic compound or a mixture of organic compounds composed solely of carbon, hydrogen and oxygen and contain a six carbon atom aromatic ring

(2) boils at least 100 Centigrade degrees above n-propanol

(3) does not form binary azeotropes with either n-propanol or 2-butanol

(4) does not form a ternary azeotrope with n-propanol and 2-butanol

(5) is miscible in boiling n-propanol-2-butanol mixtures

(6) in combination with n-propanol and 2-butanol, results in a relative volatility of n-propanol to 2-butanol in the range of 1.09 to 1.27.

4,715,934

PROCESS AND APPARATUS FOR SEPARATING METALS FROM SOLUTIONS

Pentti Tamminen, Espoo, Finland, assignor to LTH Associates, Helsinki, Finland

Filed Nov. 18, 1985, Ser. No. 799,009
Int. Cl.[4] C25C *5/02, 7/00*
U.S. Cl. 204—10 **39 Claims**

1. A process for depositing a metal from a solution containing said metal onto a metal-collecting face of a cathode electrode, said cathode electrode and an anode electrode, mounted with a face substantially parallel to said metal-collecting face, forming part of an electrochemical cell, comprising the steps of:

providing said solution to said cell at least in the area thereof between said electrodes;

applying a substantial centrifugal force to said electrodes and said solution, said force having a substantial component in a direction perpendicular to and outward from the metal collecting face; and

applying an electric current to said electrodes.

4,715,935

PALLADIUM AND PALLADIUM ALLOY PLATING

John R. Lovie, New Providence, N.J.; Gerardus A. Somers, Schayk, and Jan J. M. Hendriks, Sint Oedenrode, both of Netherlands, assignors to OMI International Corporation, Warren, Mich.

Filed Jan. 21, 1986, Ser. No. 819,968
Claims priority, application United Kingdom, Jan. 25, 1985, 8501856
Int. Cl.[4] C25D *3/52, 3/56*
U.S. Cl. 204—44.6 **15 Claims**

1. A method of electroplating palladium metal or paliadium alloy on a substrate which comprises contacting the substrate to be plated with an aqueous electroplating composition comprising a source of palladium metal, a source of oxalate ions and, optionally, a source of alloying metal ions wherein, the source of the palladium metal and the source of oxalate ions are added together to the composition in the form of a complex selected from the group consisting of palladium oxalate complexes and palladium complexes which yield oxalate ions in the aqueous electroplating composition, passing an electric current through the aqueous electroplating composition between an anode and the substrate to be plated as the cathode to cathodically electrify said substrate and cause the electrodeposition of a palladium containing layer thereon.

4,715,936

PROCESS FOR ANODIZING ALUMINUM FOR AN ALUMINUM ELECTROLYTIC CAPACITOR

Steven M. Florio, Williamstown, Mass., assignor to Sprague Electric Company, North Adams, Mass.

Filed Apr. 2, 1984, Ser. No. 595,883
Int. Cl.[4] C25D *11/08*
U.S. Cl. 204—58 **2 Claims**

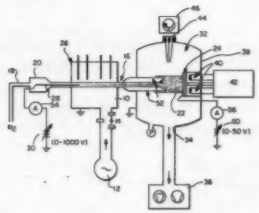
1. A process for anodizing aluminum for an aluminum electrolytic capacitor, said process comprising applying an anodization voltage while passing aluminum capacitor foil through a bath wherein the only anodizing ion is present as 0.05 to 5 wt% of a dicarboxylic acid selected from aspartic acid and glutamic acid dissolved in an aqueous solvent at a temperature of 25° to 100° C. and neutralized to a pH of 5.5 to 8 by a basic reagent selected from sodium hydroxide, potassium hydroxide, ammonia, ethylamine, diethylamine, and triethylamine, thereby forming a partially crystalline barrier layer dielectric oxide on said aluminum capacitor foil.

4,715,937

LOW-TEMPERATURE DIRECT NITRIDATION OF SILICON IN NITROGEN PLASMA GENERATED BY MICROWAVE DISCHARGE

Mehrdad M. Moslehi, Palo Alto; Chi Y. Fu, San Francisco County, and Krishna Saraswat, Santa Clara County, all of Calif., assignors to The Board of Trustees of the Leland Stanford Junior University, Stanford, Calif.

Filed May 5, 1986, Ser. No. 859,943
Int. Cl.[4] C23C *8/24*
U.S. Cl. 204—177 **7 Claims**



1. A low-temperature process for forming an ultra-thin

silicon nitride film on a silicon substrate by direct plasma nitridation of silicon comprising the steps of

supporting a wafer comprising said silicon substrate on a wafer support in a stainless steel nitridation chamber,

leading a quartz tube from a nitrogen gas source into said plasma nitridation chamber through a resonant cavity,

establishing a fluorine and hydrogen-free nitrogen atmosphere in said quartz tube,

generating nitrogen plasma inside the resonant cavity of said quartz tube, said plasma extending through the quartz tube into said nitridation chamber to the surface of said wafer,

inserting a silicon rod into an end of said quartz tube distant from said wafer support, and

providing an electrical connection between said silicon rod and a first voltage source to produce an anodization current and an electrical connection between said wafer and a second voltage source to equalize the plasma currents at the wafer and the silicon rod to minimize contamination of said silicon nitride film.

4,715,938

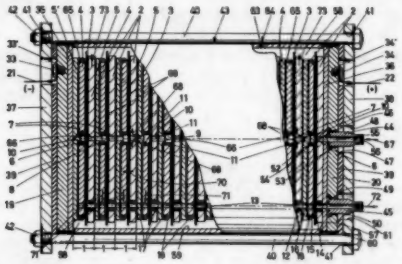
METHOD AND APPARATUS FOR ELECTROLYZING WATER

Roger E. Billings, 3420 Pink Hill Circle, Blue Springs, Mo. 64015

Continuation of Ser. No. 844,694, Mar. 27, 1986. This application Nov. 4, 1986, Ser. No. 926,721

Int. Cl.[4] C28B *1/02*

U.S. Cl. 204—129 **18 Claims**



15. A method for electrolysis of water to produce hydrogen and oxygen therefrom; said method comprising the steps of:

(a) providing at least one electrolysis cell including a solid electrolyte membrane positioned between an open porous anode plate and an open porous cathode plate;

(i) said anode plate and said cathode plate contacting mutually opposite sides of said membrane;

(b) wetting, with water, surfaces of said anode and cathode plates which abut said membrane;

(i) said wetting being by providing conveyance of water into and substantially radially through said anode plate from a central portion of said anode plate toward an outer perimeter thereof; and

(c) passing a current through said electrolysis cell to generate hydrogen gas at said cathode plate and oxygen gas at said anode plate.

4,715,939

METHOD FOR REMOVAL OF MONOVALENT IONS FROM $ZNSO_4$ ELECTROLYTE BY ELECTRODIALYSIS

Donald L. Ball, Castlegar, and Daniel A. D. Boateng, Montrose, both of Canada, assignors to Cominco Ltd., Vancouver, Canada

Filed Apr. 21, 1987, Ser. No. 41,026

Claims priority, application Canada, Apr. 22, 1986, 507254

Int. Cl.[4] B01D *13/02*

U.S. Cl. 204—182.4 **25 Claims**

1. A method for the purification of zinc sulfate electrolyte containing concentrations of monovalent cations including at least one cation chosen from the group consisting of thallium, sodium and potassium and monovalent anions including at least one anion chosen from the group consisting of chloride and fluoride by electrodialysis, which method comprises the steps of feeding zinc sulfate electrolyte to diluate cells of an electrodialysis unit comprising a multiplicity of alternating monovalent cation permselective exchange membranes and monovalent anion permselective exchange membranes, said membranes defining alternating diluate and concentrate cells, an anode compartment and a cathode compartment, an anode positioned in the anode compartment and a cathode positioned in the cathode compartment; rinsing said anode compartment and said cathode compartment with circulating rinse solutions; applying an electrical current between the anode and the cathode at a value such that the value of the corresponding current density is in the range of about 10 to 500 A/m^2; maintaining the temperature in the unit in the range of about 0° to 60° C.; feeding electrolyte at a pH having a value of less than about 5.5; passing flows of solutions through the diluate and concentrate cells at a linear velocity sufficient to maintain turbulent flow in said cells; withdrawing a diluate from said diluate cells; and recovering purified zinc sulfate electrolyte with reduced concentrations of monovalent cations and monovalent anions.

4,715,940

MASK FOR PATTERNING ELECTRODE STRUCTURES IN THIN FILM EL DEVICES

Robert A. Boudreau, Hampton, N.H., assignor to GTE Products Corporation, Danvers, Mass.

Filed Oct. 23, 1985, Ser. No. 790,590

Int. Cl.[4] C23C *14/00*

U.S. Cl. 204—192.1 **30 Claims**

1. A mask for the patterning of electrode structures for a thin film device having at least a substrate, said mask comprising

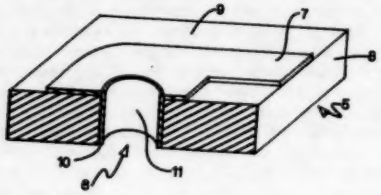
a plurality of metallic strips which extend across said mask are are substantially parallel to each other, each strip having an equal thickness, T_S, and a first major surface and an opposed second major surface, the second surface being adapted for disposition upon solid substrate;

a series of metallic interconnecting bridges which extend across said mask and are perpendicular to said strips and said bridges defining a predetermined pattern of elongated apertures having rounded profiles, each of said bridges having an equal thickness, T_B, and a first surface and an opposed second surface, the first surface of each bridge and the first major surface of each strip being coplanar, and the thickness, T_S, of each strip being greater than the thickness, T_B, of each bridge, whereby an opening is provided between the bridge and the substrate when the mask is disposed against the substrate.

4,715,941
SURFACE MODIFICATION OF ORGANIC MATERIALS TO IMPROVE ADHESION

Carol R. Jones, Binghamton, and Robin A. Susko, Owego, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 14, 1986, Ser. No. 851,856
Int. Cl.[4] C23C *14/00*
U.S. Cl. 204—192.36 18 Claims

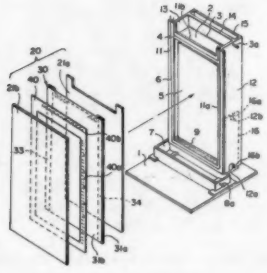


1. A method of roughening an organic surface previously modified by a silicon containing fluid, said method comprising subjecting said surface to an oxygen containing plasma whereby all portions of said organic surface subjected to said oxygen containing plasma are uniformly roughened to promote adhesion between said surface and material subsequently applied thereto.

4,715,942
ELECTROPHORESIS APPARATUS

Sigeru Tezuka; Shoichi Yamamoto, and Masayoshi Yamamoto, all of Saitama, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Feb. 9, 1987, Ser. No. 12,402
Claims priority, application Japan, Feb. 7, 1986, 61-25587
Int. Cl.[4] G01N *27/28*
U.S. Cl. 204—299 R 6 Claims



1. An electrophoresis apparatus for conducting electrophoresis by use of an electrophoresis sheet composed of two sheet members formed of a non-conductive organic polymer film and disposed to stand facing each other, spacers having predetermined thicknesses disposed at right and left edge portions between the two sheet members, and an electrophoresis gel membrane of uniform thickness grasped between the two sheet members,

wherein the improvement comprises the provision of:

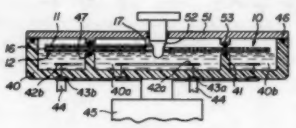
(i) a pair of flat plate-like supporting members for supporting said electrophoresis sheet by sandwiching it therebetween, and

(ii) a spacer disposed between said electrophoresis sheet and at least one of said flat plate-like supporting members, and contacting edge portions of said electrophoresis sheet.

4,715,943
APPARATUS FOR SEPARATING A MIXTURE OF COMPONENTS BY THIN LAYER ELECTROPHORESIS

John Place, Geneva, and André Bregnard, Le Lignon, both of Switzerland, assignors to Battelle Memorial Institute, Geneva, Switzerland

Continuation of Ser. No. 702,721, Feb. 19, 1985, abandoned.
This application Nov. 26, 1986, Ser. No. 935,591
Claims priority, application Switzerland, Feb. 22, 1984, 853/84
Int. Cl.[4] G01N *21/22*
U.S. Cl. 204—299 R 13 Claims



1. Apparatus for separating by thin layer electrophoresis a mixture of components capable of being selectively displaced in an electrically conducting medium under the influence of an electric potential applied to the medium, comprising

(a) means for incorporating said mixture in said medium, the latter consisting of a gel contained in the moulding cavity of a mould for thin layers of polymer;

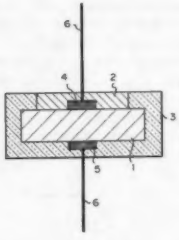
(b) means for connecting two distinct portions of this gel to the poles of a current source, characterized by the fact that it additionally comprises

(c) means for detecting and measuring, during the electrophoresis or, the relative positions of the separated components of the mixture and their separation velocity in the gel.

4,715,944
GAS SENSOR

Hiroaki Yanagida, Kashiwa, and Tadashi Ogata, Fuchu, both of Japan, assignors to Kabushiki Kaisha Advance Kaihatsu Kenkyujo, Tokyo, Japan

PCT No. PCT/JP85/00304, § 371 Date Jan. 31, 1986, § 102(e) Date Jan. 31, 1986, PCT Pub. No. WO85/05681, PCT Pub. Date Dec. 19, 1985
PCT Filed May 31, 1985, Ser. No. 833,400
Claims priority, application Japan, Jun. 1, 1984, 59-110856
Int. Cl.[4] G01N *27/58*
U.S. Cl. 204—426 9 Claims



1. A gas sensor for measuring the concentration of CO_2, Cl_2, SO_x or NO_x in an ambient atmosphere comprising

(a) a shaped solid electrolyte;

(b) a measurement electrode attached to a part of the surface of said solid electrolyte;

(c) a layer of a metal salt capable of forming a dissociative equilibrium with a gas component to be measured and which covers the exposed surfaces of both said measure-

ment electrode and said solid electrolyte adjacent said measurement electrode;

(d) a reference electrode attached to a part of the surface of said solid electrolyte other than that covered with said metal salt layer;

(e) a gas-intercepting layer covering the exposed surface of said reference electrode and substantially all of the remaining surface, not covered with said metal salt layer, of said solid electrolyte, said gas intercepting layer being substantially gas impermeable, and sealing said reference electrode from the ambient atmosphere, and

(f) lead lines for taking out potentials from said measurement electrode and said reference electrode.

4,715,945
AROMATIC PITCH

Ghazi Dickakian, Scotch Plains, N.J., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 241,431, Mar. 6, 1981, abandoned. This application May 9, 1983, Ser. No. 492,593

Int. Cl.⁴ C01C *1/16*

U.S. Cl. 208—40 **5 Claims**

1. A process for the preparation of an aromatic pitch suitable for manufacturing a carbon product with an anisotropic structure comprising:

providing a cat cracker bottom;

distilling said cat cracker bottom to obtain a distillate fraction, said distillate fraction having a boiling point in the range of from about 500° F. to about 1000° F.;

treating said fraction at a temperature within the range of about 400° C. to about 450° C. and 10–200 mm Hg for a period of time ranging from about 30 to about 600 minutes to produce an aromatic pitch containing a toluene insoluble content of 50 to 90 weight percent and a quinoline insoluble content of 10 to 60 weight percent; and

stripping said treated fraction to remove a portion of the distillable oil from the treated mixture.

4,715,946
PROCESS FOR DEASPHALTING A HYDROCARBON CHARGE CONTAINING ASPHALTENES

Jean-Francois Le Page, Rueil Malmaison; Alain Billon, Orlienas; Frédéric Morel, Sainte Foy Les Lyon; Pierre Renard, Saint Nom la Breteche; Jean-Michel Biedermann, Montivilliers; Michel Laborde, Sainte Foy les Lyon, and Jacques Bousquet, Irigny, all of France, assignors to Institut Francais du Petrole, Rueil-Malmaison, France

Filed Apr. 4, 1986, Ser. No. 848,083

Claims priority, application France, Apr. 5, 1985, 85 05350

Int. Cl.⁴ C10C *3/00*

U.S. Cl. 208—45 **12 Claims**

1. A process for deasphalting an asphaltene-containing hydrocarbon charge, comprising the steps of:

(a) heating to 100°–220° C. a mixture of hydrocarbon charge with a first solvent charge comprising at least one paraffinic, olefinic or cycloparaffinic hydrocarbon having 3 to 7 carbon atoms, and feeding said heated mixture to a settling zone, the volume ratio of the solvent charge to the hydrocarbon charge being from 2.5/1 to 6/1,

(b) settling the mixture in a settling zone, at a temperature from 100°–220° C., to form a light phase containing deasphalted oil and solvent and a heavy asphalt phase, wherein said light phase flows upward at an upflow velocity of less than 1 cm/second, and separating the light phase from the heavy asphalt phase,

(c) subjecting the heavy asphalt phase to washing, by downward flow in a substantially vertical washing zone, counter-currently with an upward flow of a second solvent charge, said second solvent charge having substantially the same composition as the first solvent charge and being introduced at a temperature from 5° to 50° C. lower than the temperature of introduction of the heavy asphalt phase in the washing zone, the solvent/asphalt phase volume ratio in said washing zone ranging from 0.5/1 to 8/1, and recovering an oil-solvent upper phase of low asphaltene content and a lower asphalt-solvent phase of high asphaltene content,

(d) directly recycling the oil-solvent upper phase of step (c) to the settling zone of step (a),

(e) separating the solvent from the lower phase of step (c) and recovering an asphalt phase, and

(f) separating the solvent from the light phase of step (b) and recovering the deasphalted oil phase.

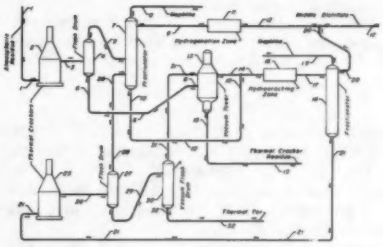
4,715,947
COMBINATION PROCESS FOR THE CONVERSION OF A RESIDUAL ASPHALTENE-CONTAINING HYDROCARBONACEOUS STREAM TO MAXIMIZE MIDDLE DISTILLATE PRODUCTION

Darrell W. Staggs, Hoffman Estates, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Nov. 24, 1986, Ser. No. 934,511

Int. Cl.⁴ C10G *65/14, 69/06*

U.S. Cl. 208—68 **14 Claims**



1. A process for the conversion of a residual asphaltene-containing hydrocarbonaceous charge stock to selectively produce large quantities of high quality middle distillate while minimizing hydrogen consumption which process comprises the steps of:

(a) reacting said residual asphaltene-containing hydrocarbonaceous charge stock in a first non-catalytic thermal reaction zone at thermal cracking conditions including an elevated temperature from about 700° F. (371° C.) to about 950° F. (510° C.) a pressure from about 15 psig (103 kPa gauge) to about 100 psig (689 kPa gauge) and an equivalent residence time at 900° F. (482° C.) from about 2 to about 30 seconds to provide a first non-catalytic thermal reaction zone effluent;

(b) passing said first non-catalytic thermal reaction zone effluent into a first separation zone operated at conditions which result in the separation of entering hydrocarbonaceous compounds to provide a first middle distillate stream having olefinic hydrocarbonaceous compounds, a first distillate hydrocarbonaceous stream boiling at a temperature greater than about 700° F. (371° C.) and a first non-distillable hydrocarbonaceous stream;

(c) hydrotreating said first middle distillate stream having olefinic hydrocarbonaceous compounds recovered in step (b) in a catalytic hydrotreating reaction zone at hydrotreating conditions to saturate at least a portion of said olefinic hydrocarbonaceous compounds to provide a first high quality middle distillate product stream;

(d) reacting said first distillate hydrocarbonaceous stream boiling at a temperature greater than about 700° F. (371° C.) with hydrogen, in a catalytic hydrocracking reaction zone, at hydrocracking conditions including a maximum catalyst bed temperature in the range of about 600° F. (315° C.) to about 850° F. (454° C.) selected to convert at least a portion of said first distillate hydrocarbonaceous stream to lower-boiling hydrocarbonaceous products including a second high quality middle distillate stream;

(e) separating the hydrocarbonaceous effluent stream produced in said catalytic hydrocracking zone of step (d) to provide a second high quality middle distillate product stream and a second distillate hydrocarbonaceous stream boiling at a temperature greater than about 700° F. (37120 C.);

(f) reacting said second distillate hydrocarbonaceous stream boiling at a temperature greater than about 700° F. (371° C.) in a second non-catalytic thermal reaction zone at thermal cracking conditions including an elevated temperature from about 700° F. (371° C.) to about 950° F. (510° C.), a pressure from about 50 psig (345 kPa gauge) to about 400 psig (2756 kPa gauge) and an equivalent residence time at 900° F. (482° C.) from about 5 to about 90 seconds to provide a second non-catalytic thermal reaction zone effluent;

(g) passing said second non-catalytic thermal reaction zone effluent into a second separation zone operated at conditions to provide a thermal tar stream, a second middle distillate stream having olefinic hydrocarbonaceous compounds, and a third distillate hydrocarbon stream boiling at a temperature greater than about 700° F. (371° C.);

(h) passing at least a portion of said second middle distillate stream having olefinic hydrocarbonaceous compounds into said first separation zone; and

(i) passing at least a portion of said third distillate hydrocarbon stream boiling at a temperature greater than about 700° F. (371° C.) into said first separation zone.

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IMPROVING THE LIFE OF A CATALYST USED TO PROCESS HYDROCARBON CONTAINING FEED STREAMS

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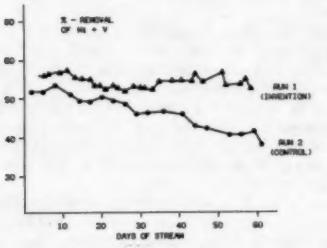
Continuation-in-part of Ser. No. 511,078, Jul. 6, 1983, abandoned. This application Feb. 17, 1984, Ser. No. 581,458

Int. Cl.[4] C10G *45/00*; C03C *6/08*

U.S. Cl. 208—251 H **11 Claims**



1. In a hydrofining process in which a hydrocarbon-containing feed stream is contacted under hydrofining conditions with hydrogen and a catalyst composition comprising a support selected from the group consisting of alumina, silica and silica-alumina and a promoter comprising at least one metal from Group VIB, Group VIIB, and Group VIII of the periodic table and in which said catalyst composition has been partially deactivated by use in said hydrofining process, a method for improving the activity of said catalyst composition for said hydrofining process comprising the step of adding a decomposable compound of molybdenum to said hydrocarbon-containing feed stream prior to contacting said hydrocarbon-containing feed stream with said catalyst composition, wherein the molybdenum in said decomposable compound is in a valence state of zero, wherein a sufficient quantity of said decomposable compound of molybdenum is added to said hydrocarbon-containing feed stream to result in a concentration of molybdenum in said hydrocarbon-containing feed stream in the range of about 1 to about 60 ppm and wherein said added decomposable compound was not added to said hydrocarbon-containing feed stream during the period of time that said catalyst composition was partially deactivated by said use in said hydrofining process.

4,715,949

HEAVY METAL SEPARATOR

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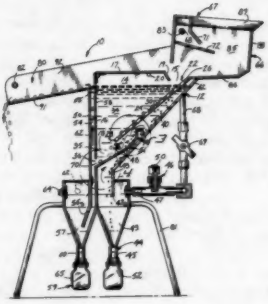
Continuation-in-part of Ser. No. 885,835, Jul. 14, 1986. This application Nov. 5, 1986, Ser. No. 927,314

Int. Cl.[4] B03B *5/68, 7/00*

U.S. Cl. 209—17 **22 Claims**



1. A heavy metal separator for separating ore consisting of fine and coarse material into heavy metal particles and waste particles in which the heavy metal particles include fine heavy metal flakes having an elongated major dimension, comprising:

means defining a separation chamber having an upper and a lower end;

screen means mounted in the chamber, having a feed end adjacent the upper end of the chamber, extending downwardly at an inclined angle to a discharge end, the screen means dividing the chamber into a first section above the screen means and a second section below the screen means with the screen means positioned to receive the ore and adapted to allow the ore to gravitationally move downward over the screen means with the fine material passing therethrough and descending into the second section;

an inclined wall, forming part of the second section and situated below the screen means, positioned to receive the fine material and to direct it on a downward path;

a first water inlet means connected to the second section for providing an ascending stream of water into the second section; and

baffle means mounted in the separation chamber having one end located in said second section for directing the stream of water in a direction opposite the fine material moving on said downward path for washing waste particles from the fine material and directing the waste particles from the second section into the first section;

the inclined wall in conjunction with the baffle means defines a flow passage which is adapted to orient the fine heavy metal flakes with their elongated major dimension substantially parallel with the inclined wall to minimize the cross sectional area of the flakes perpendicular with the inclined wall.

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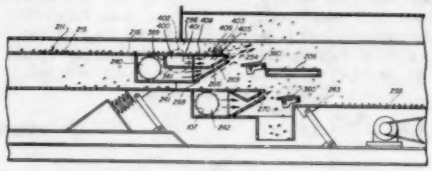
VIBRATORY SEPARATION APPARATUS

Gary A. Danner, and Raymond W. Sherman, both of Barrington, Ill., assignors to General Kinematics Corporation, Barrington, Ill.

Continuation of Ser. No. 710,606, Mar. 11, 1985, abandoned, which is a continuation-in-part of Ser. No. 589,651, Mar. 14, 1984, Pat. No. 4,624,370. This application Oct. 1, 1986, Ser. No. 914,537

Int. Cl.[4] B07B *9/02*; B07C *5/38*

U.S. Cl. 209—20 10 Claims



1. An improved vibratory separating apparatus of the type having a conveying surface for moving a composite mixture in a first direction between an inlet end and a discharge end and having a first conveying plateau and a second conveying plateau spaced from the first plateau toward the discharge end and a drop-out opening between the first and second plateaus, said first plateau directing the composite mixture substantially along a plane adjacent the drop-out opening and having an edge at the drop-out opening, said second plateau having a landing area including at least a portion spaced beneath the edge of the first plateau, and means for vibrating said conveying surface to effect vibrating movement of the composite mixture, the improvement comprising:

a foraminous section in said first conveying plateau adjacent said plateau edge;

said foraminous section extending from side to side and in the first direction on the first conveying plateau;

first means for forcibly delivering air upwardly through the foraminous section to fluidize the composite material and to break up clumped composite material; and

second means for forcibly delivering air into the drop-out opening angularly upwardly and in said first direction from underneath the composite mixture moving over the first plateau edge so that forced air from the second means cooperates with forced air delivered upwardly through the foraminous section to thereby cause air delivered through the foraminous section to be drawn in the first direction so that the air both delivered upwardly through the foraminous section and directed angularly upwardly by the second means through the drop-out opening propels materials of a predetermined size and density over the drop-out opening and onto the landing area on the second plateau for conveyance to a first area,

said materials other than those intercepted by the landing area falling through the drop-out opening for separate collection in a second area.

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APPARATUS FOR SEPARATING GRANULATE MATERIAL

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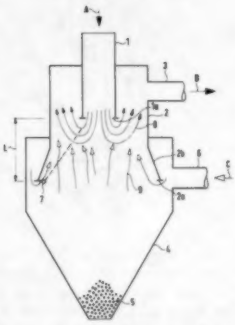
Continuation of Ser. No. 711,472, Mar. 13, 1985, abandoned. This application Oct. 21, 1986, Ser. No. 921,887

Claims priority, application Fed. Rep. of Germany, Mar. 16, 1984, 3409814

Int. Cl.[4] B07B *7/02*

U.S. Cl. 209—138 3 Claims

1. Apparatus for pneumatically separating mixed granulate material, comprising a vertically disposed housing closed at its top and open at its bottom defining an interior chamber, a collecting hopper concentrically surrounding said housing having a cylindrical wall extending at least in part below the bottom of said housing and having an upper end wall mounted on said housing and a conical bottom wall below said housing for collecting material therein, pneumatic feed means for delivering mixed granulate material to said housing said pneumatic feed means comprising a feed pipe extending concentrically through the top of said housing terminating in a mouth in said chamber below said top and above said bottom, said housing having a side wall section below the mouth of said feed pipe widened conically outward in the direction of said collecting hopper defining a widening space within said housing, an air discharge conduit radially passing through said housing in communication with said chamber above said mouth and an



inlet conduit means radially passing through the cylindrical wall of said collecting hopper for introducing air radially into said housing in part impinging on the outer surface of said side wall section and in part being deflected upwardly into the mouth of the conically widened side wall section of said housing, the widening space within said housing between the mouth of said feed pipe and the edge of the conically widened side wall section of said housing preventing said granulate material from being radially impinged thereon and defining a braking stretch in which the downwardly moving particles are contacted by the radial and upward counter moving air to effect classification of said granulate material therein whereby the coarser material falls into said hopper and the finer material is discharged through said discharge conduit.

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REVERSE OSMOSIS WATER PURIFICATION ELEMENT AND CARTRIDGE

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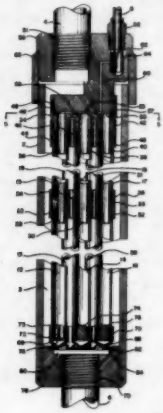
Continuation of Ser. No. 357,213, Mar. 11, 1982, abandoned. This application Dec. 30, 1983, Ser. No. 567,184

Int. Cl.[4] B01D *13/00*

U.S. Cl. 210—136 1 Claim

1. A reverse osmosis water purification unit comprising a hollow cylindrical housing, closure means at each end of the housing, said housing and closure means forming a chamber, an aqueous fluid inlet communicating with the chamber comprising a radially offset bore through one of said closure means, a brine outlet, a purified water outlet, a plurality of hollow tubular reverse osmosis separating elements mounted in the chamber, each element comprising an elongate, straight, rigid, plastic tubular member having a semipermeable membrane disposed around an exterior surface of said member, a plurality of grooves extending along the entire length of said member adapted to carry purified water passing through the membrane, conduit means for conducting said purified water to an interior portion of the element, a manifold having a plurality of mounting members comprising lugs adapted to slideably fit into end portions of the elements, thereby connecting the tubular elements to the manifold, a purified water collection

chamber, and second conduit means extending through the mounting member connecting the interior of each tubular element to the purified water collection chamber, and check valve means to preclude flow of purified water from the purified water outlet into the chamber, said check valve means



comprising an exit chamber defined by walls having a circular cross-section and having an open end, a flexible sleeve removably mounted in said exit chamber, and an exit bore for conducting purified water from the collection chamber through a wall of the exit chamber radially with said chamber and adjacent said flexible sleeve.

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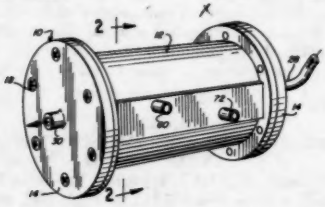
HOLLOW FIBER SEPARATION DEVICE MANIFOLD

Ronald J. Leonard, Harvard, Ill., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Apr. 1, 1983, Ser. No. 481,439

Int. Cl.[4] B01D *13/00*

U.S. Cl. 210—321.8 **11 Claims**



1. In a hollow fiber separation device which comprises a core, a bundle of hollow tubular fibers for separation of materials, said fibers being circumferentially wrapped about the longitudinal axis of said core, a housing enclosing said bundle, a first manifold system for permitting fluid flow through said bundle in a first flow path in contact with the exterior surfaces of said hollow fibers, and a second manifold system for permitting fluid flow through the bores of said hollow fibers in a second flow path separated from the first flow path, said second manifold system including a space extending longitudinally through said circumferentially wrapped bundle exposing open ends of said fibers at opposed sides of said space, regions of said bundle adjacent to said space being potted to prevent leakage around said fibers, the improvement comprising, in combination:

said second manifold system including an inlet conduit and an outlet conduit, each being in flow communication with said space, and partition means in said space to isolate fluid flow between the inlet conduit and one of said opposed sides from fluid flow between the outlet conduit and the other of said opposed sides.

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TRIANGULAR FILTER CARTRIDGE AND APPARATUS

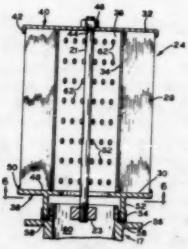
Howard T. DeGraffenreid, P.O. Box 261, Inola, Okla. 74036

Continuation-in-part of Ser. No. 632,451, Jul. 19, 1984, Pat. No. 4,613,438. This application Sep. 22, 1986, Ser. No. 910,693

The portion of the term of this patent subsequent to Sep. 23, 2003, has been disclaimed.

Int. Cl.[4] B01D *29/32*

U.S. Cl. 210—323.1 **4 Claims**



1. A fluid filter apparatus comprising:

a vessel having a generally cylindrical inner surface and a longitudinal axis,

a filter cartridge assembly for filtering a fluid and comprising a plurality of individually replaceable filter cartridges disposed in said filter vessel,

each said replaceable filter cartridge comprising an elongate permeable filter medium including means defining a passage therein, said filter medium remaining in an essentially constant configuration throughout the filtering process, a porous support member being in supporting relationship with said elongate permeable medium, and upper and lower end caps secured to respective opposite ends of said elongate permeable filter medium, said elongate permeable filter medium having a generally triangularly shaped outer peripheral surface having three substantially flat elongate sides, adjacent ones of the elongate sides being joined by an arcuate portion so that each triangularly shaped filter cartridge has rounded corners,

at least some of said filter cartridges being arranged in a generally circular pattern around the inner cylindrical surface of the vessel such that a flat side of each of said cartridges in the circular pattern is in direct facing relationship with said vessel inner surface and an opposite rounded corner of the cartridge faces radially inward toward the longitudinal axis of said vessel, adjacent flat sides of adjacent cartridges in the circular pattern generally facing each other, whereby the filter cartridges are closely spaced within said vessel thereby increasing filtration capacity; and

a plurality of mounting stools within a lower portion of said vessel,

said lower end cap comprising a generally cylindrical skirt depending downwardly and being sealingly supported against a respective said mounting stool, said skirt encircling and being concentric with an upwardly extending skirt portion of said mounting stool.

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ULTRAFILTRATION APPARATUS

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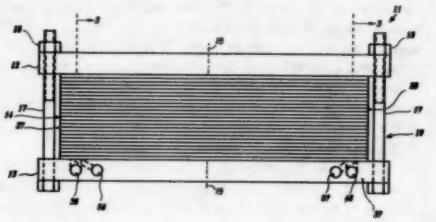
Filed Dec. 22, 1986, Ser. No. 944,060
Int. Cl.[4] B01D *13/00*
U.S. Cl. 210—346 21 Claims



1. A filtration apparatus comprising:

a filtration module comprising an axially stacked plurality of filter membrane sheets, said module defining a stack of fluid flow chambers having multi-edged perimeters and disposed on opposite sides of and substantially coextensive with each said membrane sheet, the perimeters of said membrane sheets and said chambers being sealed such that fluid flow between adjacent chambers must pass through a said membrane sheet straddled thereby; said module defining a plurality of feed passages communicating with alternating ones of said chambers adjacent first axially aligned edges thereof, a plurality of retentate passages communicating with said alternating chambers adjacent to second axially aligned edges thereof opposite to said first edges, and a plurality of filtrate passage means communicating with other ones of said chambers between said alternating ones thereof, said filtrate passage means entering said other chambers adjacent to either said first or second aligned edges;

a base frame means; and

a pair of parallel plates supported by said frame means and movable thereon relative to each other in directions normal thereto, said module being retained between said parallel plates with said direction of movement thereof aligned with the axis of said membrane sheets; and wherein one of said plates defines a first channel substantially parallel to and axially aligned with said first edges, a second channel substantially parallel to and axially aligned with said second edges, and a third channel means including one portion substantially parallel to either of said first and second edges and another portion transverse thereto and extending a distance therebetween.

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VIBRATING SCREEN CENTRIFUGE

Wolfgang Heckmann, Bergisch Gladbach, and Wolfgang Epper, Bergheim, both of Fed. Rep. of Germany, assignors to Klöckner-Humboldt-Deutz Aktiengesellschaft, Fed. Rep. of Germany

Filed Jul. 14, 1986, Ser. No. 885,230
Claims priority, application Fed. Rep. of Germany, Jul. 12, 1985, 3524878
Int. Cl.[4] B01D *17/038*
U.S. Cl. 210—363 20 Claims

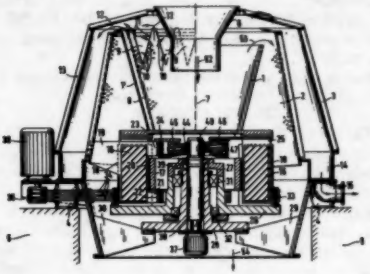
1. A vibrating screen centrifuge for dewatering fine-grained material comprising in combination:

a first container for receiving material providing a first mass;

a second container for receiving material from the first for separating material from liquid providing a second mass;

means enabling mutual cancellation of mass forces sufficient to preclude transmission of mass forces on to the bearings of said centrifuge, including resilient connections between said masses permitting relative movement between containers limited by said connections;

means driving said masses in simultaneous rotation;



and means inducing vibration in said masses with a phase shift of 180° in an axial direction with said resilient connections accommdating vibrations of each mass relatively independent of the other.

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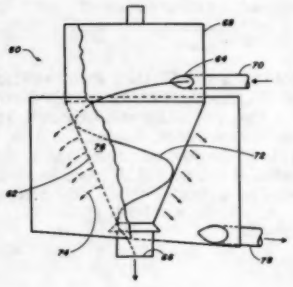
CORN-WATER SLURRY SEPARATOR DEVICE

Kevin C. Cogan, Carrollton; Edward L. Ouellette, Corinth, and Martin Morua, Irving, all of Tex., assignors to Frito-Lay, Inc., Dallas, Tex.

Continuation of Ser. No. 608,380, May 9, 1984, abandoned. This application May 1, 1986, Ser. No. 858,867
Int. Cl.[4] B04C *5/10*; B01D *53/24*
U.S. Cl. 210—497.3 4 Claims



1. A stationary, non-moving dewatering device for separating corn from a corn and water slurry comprising:

a. an upper cylindrical portion of said device oriented about a vertical axis having walls defining an upper inlet port;

b. an inverted conical portion adjacent the upper cylindrical portion, the inverted conical portion tapering from top to bottom and defining a lower exit port;

c. the walls of said inverted conical portion being of a non-protruding surface and defining apertures evenly spaced throughout said non-protruding surface, said apertures being sized to permit the passage therethrough of the water in the corn and water slurry, while preventing the passage therethrough of the corn in the corn and water slurry; and

d. the upper cylindrical portion defining an inlet port therein, said inlet port being aligned with a corn and water slurry inlet pipe such that said slurry is introduced tangentially into said inverted conical portion;

whereby the slurry is decelerated as it traverses said inverted conical portion, thus minimizing damage to the corn.

4,715,958

PROCESS AND MEANS FOR CONDUCTING THE DENITRIFICATION OF WATER

Uwe Fuchs, Munich, Fed. Rep. of Germany, assignor to Linde Aktiengesellschaft, Wiesbaden, Fed. Rep. of Germany

Continuation of Ser. No. 525,360, Aug. 22, 1983, abandoned. This application Oct. 21, 1985, Ser. No. 788,705

Claims priority, application Fed. Rep. of Germany, Aug. 28, 1982, 3232095

The portion of the term of this patent subsequent to Sep. 4, 2001, has been disclaimed.

Int. Cl.[4] C02F *3/08, 3/10*

U.S. Cl. 210—605 **15 Claims**

1. In a process for the biological denitrification of water which is at least substantially free of carbon, and wherein the water is denitrified in a reactor in the presence of a carrier material supporting denitrifying microorganisms thereon, the improvement comprising conducting denitrification in a reactor in the presence of a carrier material which is not a carbon source for denitrifying microorganisms carried thereon and which is impregnated with organic substances separate from the carrier material in a manner such that the organic substances do not effectively enter into solution with the water being treated, with no substantial increase in BOD_5, said organic substances being biodegradable and at least partially insoluble in water and being employed as a carbon source by the denitrifying microorganisms, and the carrier material having been impregnated with said organic substances prior to being placed in the reactor for conducting the denitrification process whereby the requirement of providing a separate carbon source for the denitrifying microorganisms to effect denitrification is avoided, said carrier material being non-surface active and comprising at least one of sand, gravel, plastic filler bodies, porous mineral material, urea-formaldehyde resins, polyethylene, polypropylene, polyurethane, silicone polymers and natural sponges, and is in at least one of open-celled, foam and sintered lump form, and wherein influent water introduced into the reactor has a COD-content of about 1–200 mg/l.

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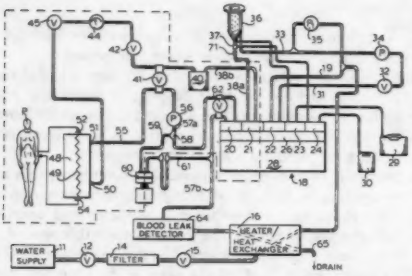
APPARATUS AND METHOD FOR CONTROLLING ULTRAFILTRATION DURING HEMODIALYSIS

Jonathan M. Allan, Portland; Richard J. Burton, Tigard, both of Oreg., and Volker Jurock, Rodgau, Fed. Rep. of Germany, assignors to CD Medical Inc., Miami Lakes, Fla.

Continuation of Ser. No. 413,287, Aug. 31, 1982, Pat. No. 4,477,342. This application May 3, 1984, Ser. No. 606,505

Int. Cl.[4] B01D *13/00*

U.S. Cl. 210—637 **3 Claims**



3. A method of hemodialytic ultrafiltration using a semipermeable membrane device having a blood chamber and a dialysate chamber that minimizes pressure transients in the dialysate chamber of the semipermeable membrane device and thereby reduces ultrafiltration error caused by system compliance comprising the steps:

providing fresh dialysate fluid;

reducing and regulating the pressure of said fresh dialysate fluid to substantially match the pressure in the dialysate chamber of the semipermeable membrane device;

introducing said reduced pressure fluid to an input of a first positive displacement device;

conveying said reduced pressure fluid from an output of the positive displacement device to the input of the semipermeable membrane device;

withdrawing said reduced pressure fluid from an output of the semipermeable membrane device;

increasing the pressure of said withdrawn fluid; and

introducing said increased pressure withdrawn fluid to an input of a second positive displacement device and to an input of an ultrafiltrate withdrawal device.

4,715,960

METHOD FOR THE MODIFICATION OF POLYCARBONATE MEMBRANES, THE MEMBRANES PRODUCED BY SUCH METHOD AND THEIR USE

John A. Thompson, Wyoming, Canada, assignor to Exxon Research and Engineering Company, Florham Park, N.J.

Filed Mar. 10, 1983, Ser. No. 474,008

Int. Cl.[4] B01D *13/00*

U.S. Cl. 210—651 **10 Claims**

5. A method for selectively separating organic liquids by the use of polycarbonate membrane prepared by the treatment method comprising contacting said membrane with a solvent having a solubility parameter in the range 8.9–10 (cal/cm^3) 0.5, said contacting being conducted for a time sufficient to result in shrinkage of the membrane but insufficient to result in dissolution of the membrane, wherein the organic liquids are separated by selective permeation through said polycarbonate membrane under conditions of temperature and pressure sufficient to effect said separation.

4,715,961

UREA ADSORBENT

Masayuki Mishima, Machida, Japan, assignor to Research Dev. Corp. of Japan and Kao Corporation, both of Tokyo, Japan

Division of Ser. No. 890,558, Jul. 30, 1986, Pat. No. 4,677,135. This application Mar. 10, 1987, Ser. No. 24,020

Claims priority, application Japan, Aug. 6, 1985, 60-171760

Int. Cl.[4] B01D *15/04*

U.S. Cl. 210—692 **8 Claims**

1. A urea adsorbent comprising hollow microspheres each including an outer layer formed of a urea-permeable polymer, and an inner layer formed of a polymer containing, as its component, a polyoxyalkylene glycol derivative expressed by the following formula (I):

$$-(CH_2)_n-O-_mR \qquad (I)$$

wherein n is an integer of 2–5, m is an integer of al least 3 and R stands for hydrogen or a methyl group.

4,715,962

AMPHOLYTIC DIALLYLDIMETHYL AMMONIUM CHLORIDE (DADMAC) COPOLYMERS AND TERPOLYMERS FOR WATER CLARIFICATION

Bhupati R. Bhattacharyya, Downers Grove; Sanjay R. Srivatsa, Naperville, and Michael L. Dwyer, Crest Hill, all of Ill., assignors to Nalco Chemical Company, Naperville, Ill.

Filed Aug. 15, 1986, Ser. No. 896,791
Int. Cl.[4] C02F 1/56
U.S. Cl. 210—708 6 Claims

1. A method of removing emulsified impurities from a waste oil emulsion selected from the group consisting of a petroleum refinery waste water and an automotive oily effluent water which comprises treating these impurity-containing waters with an effective amount of a water-soluble polymer consisting essentially of Diallyldimethyl Ammonium Chloride and either,

A. from 5 to 25 mole percent of either acrylic acid or methacrylic acid, or,

B. from 5 to 25 mole percent of either acrylic acid or methacrylic acid and from 1–10 percent of a hydroxy C_2–C_6 alkyl acrylate or methacrylate:

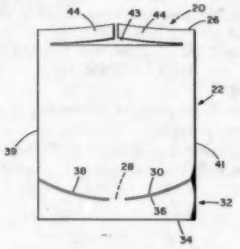
which polymer has an intrinsic viscosity of at least 0.5, and then separating the polymer and emulsified impurities from the impurity-containing waters.

4,715,963

METHOD OF DEWATERING FOOD ITEMS

Darlene N. Jones, 842 William, River Forest, Ill. 60305

Division of Ser. No. 798,925, Nov. 18, 1985, abandoned. This application Mar. 30, 1987, Ser. No. 32,177
Int. Cl.[4] B01D 17/038
U.S. Cl. 210—781 2 Claims



1. A method for dewatering food items comprising the steps of:

placing the food items in a compartment formed from flexible thinwall sheet material, said compartment having an open top and an opening opposite the open top sized to permit passage of liquid but substantially to prevent passage of the food items therethrough; and

twirling the compartment nearby its open top to cause water from the food items to be expelled through the opening by centrifugal force.

4,715,964

METHOD FOR FILTERING CONTAMINATED LIQUIDS

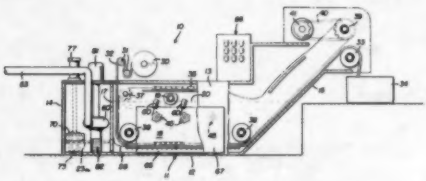
Eugene H. Harms, Perrysburg, Ohio, assignor to Henry Filters, Inc., Bowling Green, Ohio

Filed Nov. 19, 1986, Ser. No. 932,317
Int. Cl.[4] B01D 27/04, 33/04
U.S. Cl. 210—783 6 Claims

1. A method of supplying machining coolant of a predetermined clarity to a plurality of machines and supplying to other machines a lesser volume of coolant of enhanced clarity containing less than about 5 PPM particles of a size less than about 5 microns, the method comprising the steps of:

(1) dumping used coolant from all of the machines into a common pool;

(2) pumping and filtering used coolant from the pool simultaneously through (a) a perforate filter drum to obtain a large volume of coolant of the requisite clarity for said plurality of machines, and (b) a paper filter medium located at the bottom of the pool to obtain a limited volume of clean coolant of enhanced clarity containing less than



about 5 PPM particeles of a size less than about 5 microns for said other machines; and

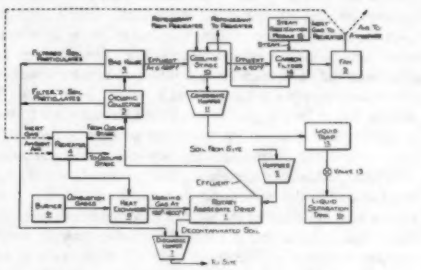
(3) circulating clean coolant of the requisite clarity from step (2)(a) to the plurality of machines and the clean coolant of enhanced clarity from step (2)(b) to those machines requiring same.

4,715,965

METHOD FOR SEPARATING AND RECOVERING VOLATILIZABLE CONTAMINANTS FROM SOIL

Adam L. Sigerson, Box 9083 - R.D. 7, Sussex, N.J. 07461, and James E. Shirk, 402 Fairmount Ave., Jersey City, N.J. 07306

Filed May 19, 1986, Ser. No. 864,720
Int. Cl.[4] F26B 3/04
U.S. Cl. 210—800 11 Claims



1. A method for separating and recovering volatilizable contaminants from soil comprising the steps of:

introducing the soil into a rotating aggregate dryer;

indirectly heating a working gas to a temperature of between 750° F. and !800° F. by passing said working gas through a heat exchanger;

volatilizing said contaminants and the moisture in the soil by passing said heated working gas through said dryer, whereby said working gas, said volatilized contaminants and moisture, and entrained soil particulates form an effluent;

drawing off said effluent from said dryer;

filtering said entrained soil particulates from said effluent;

subsequently condensing a substantial portion of said volatilized contaminants and moisture from said effluent to form a first liquid waste stream by cooling said effluent;

collecting said first liquid waste stream;

after condensing a substantial portion of said volatilized contaminants and moisture from said effluent, passing said effluent through activated carbon to remove substantially the remaining volatilized contaminants from said effluent; and

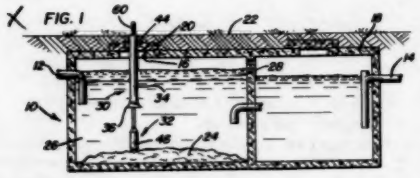
after volatilizing said contaminants and moisture in the soil in said dryer, discharging said soil from said dryer.

4,715,966

SEPTIC TANK SLUDGE LEVEL INDICATOR

Gary K. Bowman, Springfield, Ohio, assignor to Ingenuity Unlimited, Inc., Springfield, Ohio

Filed Nov. 26, 1985, Ser. No. 802,584
Int. Cl.[4] B01D *21/34*
U.S. Cl. 210—800 9 Claims



1. A septic tank sludge level indicator comprising an elongated hollow member adapted to extend through the top wall of a septic tank with the lower end thereof oriented in liquid material in the tank and the upper end thereof oriented substantially at ground level and a float assembly inserted through the hollow member from the upper end thereof and adapted to be inserted into the interior of the septic tank and into engagement with the upper surface of sludge collected in the bottom of the septic tank, said float assembly including a float member and an elongated indicator member extending above the upper end of the hollow member with the float assembly being of sufficient weight not to be buoyant in the liquid but adapted to be supported by and stopped by the upper surface of the sludge to enable the depth of sludge in the septic tank to be determined.

9. The method of determining the vertical depth of accumulated sludge in the bottom portion of a septic tank in order to enable accumulation of the sludge to a maximum safe vertical depth before removing the sludge from the tank by providing a visual indication of the depth of sludge in the tank at a point above ground level to enable determination of the sludge depth from a point above ground level, said method consisting of the steps of providing a tubular guide through the top wall of the septic tank with the upper end of the guide being substantially at ground level and the lower end of the guide being above the upper surface of the sludge when at its maximum safe depth, inserting an elongated indicator member downwardly into the guide with the indicator member including indica thereon associated with the upper end of the guide to indicate the depth of insertion of the indicator member into the guide and providing the lower end of the indicator member with means thereon engaged with the upper surface of the sludge with the weight of the indicator member and said means on the lower end thereof and the configuration of the means on the lower end thereof enabling the indicator member and means on the lower end thereof to be supported from the upper surface of the sludge when the means on the lower end of the indicator member comes into contact with the upper surface of the sludge with the indicator member and means thereon not capable of being supported by liquid in the septic tank when the indicator member and means on the lower end thereof comes into contact with the liquid thereby enabling the indicator member to be observed at ground level for determining the vertical depth of the accumulated sludge in the bottom of the septic tank.

4,715,967

COMPOSITION AND METHOD FOR TEMPORARILY REDUCING PERMEABILITY OF SUBTERRANEAN FORMATIONS

Harold E. Bellis, and Edward F. McBride, both of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 27, 1985, Ser. No. 822,589
Int. Cl.[4] E21B *43/27, 43/26*
U.S. Cl. 252—8.551 17 Claims

1. A wellbore fluid for reducing the permeability of a subterranean formation penetrated by a wellbore comprising a fluid having dispersed therein a sufficient amount of a treatment agent for successful fluid control, said treatment agent comprising discrete solid structures of a condensation product of hydroxyacetic acid with up to 15 wt. % cocondensing compounds containing other hydroxy-, carboxylic-acid-, or hydroxycarboxylic acid moieties, said condensation product having a number average molecular weight of about 200 to 4000, being substantially crystalline at both ambient and wellbore temperatures and having a melting point of about 160° or higher and sufficiently high to avoid softening or melting during use and being substantially insoluble in said wellbore fluid and degradable in the presence of water at elevated temperature to monomers and dimers which are at least partially soluble in oil or water.

4,715,968

NON-BLOOMING ANTISTATIC AGENTS

Gerald Sugerman, Allendale, N.J., and Salvatore J. Monte, Staten Island, N.Y., assignors to Kenrich Petrochemicals Inc., Bayonne, N.J.

Filed May 8, 1986, Ser. No. 861,094
Int. Cl.[4] D06M *13/26*
U.S. Cl. 252—8.6 12 Claims

1. An antistatic composition comprising a polymeric material selected from polyolefins, polystyrenic and polyester polymers having admixed therewith from 100 to 10,000 ppm of an antistatic agent which is an amino or sulfonyl titanate or zirconate.

4,715,969

CONTROLLING VISCOSITY OF FABRIC SOFTENING HEAVY DUTY LIQUID DETERGENT CONTAINING BENTONITE

Adam A. Rothanavibhata, East Brunswick, and Richard K. Payne, Sayreville, both of N.J., assignors to Colgate Palmolive Co., New York, N.Y.

Continuation of Ser. No. 685,346, Dec. 24, 1984, abandoned.
This application Jul. 23, 1986, Ser. No. 889,147
Int. Cl.[4] D06M *11/00*
U.S. Cl. 252—8.7 7 Claims

1. A fabric softening heavy duty liquid detergent composition of a density in the range of 1.15 to 1.35 g./ml. at room temperature, a pH in the range of 9.5 to 11, and a viscosity in the range of 1,000 to 5,000 centipoises, which does not increase to more than 5,000 centipoises on thirty days quiescent storage at room temperature, which comprises 6 to 12% of sodium linear higher alkylbenzene sulfonate wherein the higher alkyl is of 12 to 15 carbon atoms, 1.5 to 3% of sodium alkyl polyethoxy sulfate wherein the alkyl is of 12 to 16 carbon atoms and the polyethoxy is of 2 to 7 ethylene oxide groups, 7 to 15% of sodium tripolyphosphate, 2 to 7% of sodium carbonate, 8 to 15% of finely divided swelling bentonite, 0.12 to 0.18% fo sodium polyacrylate of molecular weight in the range of 1,000 to 3,000, and 50 to 70% of water.

4,715,970

WASH CYCLE ADDITIVE ANTISTATIC COMPOSITION FOR TREATMENT OF LAUNDRY, PROCESS FOR MANUFACTURE OF SUCH COMPOSITION AND METHOD OF USE THEREOF

Robert J. Steltenkamp, Somerset, and Michael A. Camara, Jackson, both of N.J., assignors to Colgate-Palmolive Company, New York, N.Y.

Continuation-in-part of Ser. No. 883,193, Jul. 8, 1986, which is a continuation of Ser. No. 734,508, May 16, 1985, Pat. No. 4,619,775. This application Dec. 8, 1986, Ser. No. 939,313
The portion of the term of this patent subsequent to Oct. 28, 2003, has been disclaimed.
Int. Cl.[4] C11D *3/32*
U.S. Cl. 252—8.8 **20 Claims**

1. A wash cycle additive antistatic composition for treatment of laundry in wash water to make it antistatic after washing and automatic machine drying, which comprises an antistatic proportion, sufficient to impart antistatic characteristics to the laundry during washing when the wash cycle additive composition is charged to the wash water during the wash cycle at a concentration in the range of 0.1 to 2 g./l., of antistatic polyamide of trialkylacetic acid and polyamine, wherein the alkyls of the trialkylacetic acid moiety are of 1 to 10 carbon atoms each and the polyamine moiety contains from 2 to 5 amino groups, and a particulate carrier or liquid medium for the polyamide which is a detergent builder or filler suitable for building or filling a detergent, or is an aqueous medium containing a nonionic surface active agent.

4,715,971

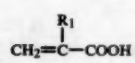
WELL DRILLING AND COMPLETION COMPOSITION

Boyton T. Blair, Slidell, La., assignor to Engineering & Colloid, Ltd., Slidell, La.

Filed Dec. 9, 1985, Ser. No. 806,437
Int. Cl.[4] C09K *7/02*
U.S. Cl. 252—8.51 **10 Claims**

1. A water base well drilling and completion composition comprising per each barrel of water base well drilling and completion composition:

(a) from about 0.10 lbs to about 6.0 lbs of a potassium salt of a copolymer of a first compound having the formula



wherein R_1 is selected from the group consisting of H and an alkyl having 1 to 4 carbon atoms, and a second compound having the formula $CH_2{=}CH{-}COO{-}R_2$ wherein R_2 is selected from the group consisting of an alkyl radical and a hydroxyalkyl wherein said alkyl and hydroxyalkyl each have 1 to 4 carbon atoms, said first compound and said second compound are combined in a molar ratio of from about 1:1 to about 3:1 of the first compound to the second compound, and said copolymer has a weight average molecular weight of less than about 20,000; and

(b) from about 0.10 quarts to about 10.0 quarts of an accelerator catalyst having water, from about 10 lbs to about 80 lbs of KOH per each bbl. of water, from about 25 lbs to about 50 lbs of lignite per each bbl. of water, and from about 1.0 lbs to about 10 lbs of sulfonated polystyrene per each bbl. of water and wherein said sulfonated polystyrene has an average molecular weight of from about 1 to about 12 million, and said accelerator catalyst having been prepared by heating the mixture of water, lignite, KOH and sulfonated polystyrene to a temperature of at least 120° F. while simultaneously stirring for at least 30 minutes.

4,715,972

SOLID LUBRICANT ADDITIVE FOR GEAR OILS

Paula J. Pacholke, 3420 Shenandoah Ave., Port Huron, Mich. 48060

Filed Apr. 16, 1986, Ser. No. 852,420
Int. Cl.[4] C10M *103/00, 125/00*
U.S. Cl. 252—25 **1 Claim**

1. A method for demulsifying contaminant water out of gear oil as determined by ASTM test D-2711 by adding to said gear oil a composition consisting essentially of:

about 0.01 percent to about 65 percent by weight of the additive composition of solid lubricant particles selected from the group consisting of molybdenum disulfide, graphite, cerium fluoride, zinc oxide, tungsten disulfide, mica, boron nitrate, boron nitride, borax, silver sulfate, cadmium iodide, lead iodide, barium fluoride, tin sulfide, fluorinated carbon, PTFE, intercalated graphite, zinc phosphide, zinc phosphate, and mixtures thereof;

about 0.01 to about 25 percent by weight of the additive composition, of a stabilizing agent consisting essentially of an ethylene-propylene copolymer consisting of approximately equivalent proportions of ethylene and propylene monomers;

and a suitable fluid carrier, and demulsifying said contaminant water.

4,715,973

LUBRICATING OIL COMPOSITIONS

Feike de Jong, and Jacob Vermeule, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Jan. 30, 1986, Ser. No. 835,580
Claims priority, application Netherlands, Mar. 15, 1985, 8500753
Int. Cl.[4] C10M *141/02*
U.S. Cl. 252—40.5 **28 Claims**

1. A composition of matter stable above 140° C. prepared by the process steps of: stirring a lubricating oil mixture comprising at least one hydrocarbon lubricating oil with at least one basic polyvalent metal salt of a naphthenic acid having a basicity of between about 100 and about 1000%, and admixing at least one compound selected from the group consisting of a first polyester, a salt of said first polyester, and mixtures thereof, said first polyester being derived from at least one hydroxycarboxylic acid of the general formula HO—X—COOH, wherein X represents a bivalent saturated or unsaturated aliphatic radical containing at least 8 carbon atoms with at least 4 carbon atoms situated between the hydroxyl group and the carboxyl group, and a second polyester, a salt of said second polyester, and mixtures thereof, said second polyester being derived from a mixture of at least one hydroxycarboxylic acid of the general formula HO—X—COOH and at least one carboxylic acid containing no hydroxyl groups to form said stable composition of matter.

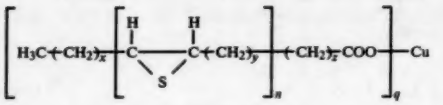
4,715,974

COPPER SALTS OF SULFURIZED FATTY ACIDS AS ANTIOXIDANTS

Liehpao O. Farng, and Andrew G. Horodysky, both of Cherry Hill, N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Apr. 14, 1987, Ser. No. 38,080
Int. Cl.[4] C10M *135/34, 153/02*
U.S. Cl. 252—46.4 **22 Claims**

1. A composition comprising a major proportion of an oil of lubricating viscosity or grease or other solid lubricant prepared therefrom and a minor multifunctional amount, sufficient to impart antioxidant and/or anticorrosion, antiwear and EP properties thereto, of a mixture of sulfurized fatty acid copper salts containing at least one copper salt having the following generalized structure:



where x and z are from 0 to about 18, n is from 1 to about 4, y is from 0 to about 3 and q is 1 or 2.

4,715,975

OIL CONTAINING DISPERSANT VII OLEFIN COPOLYMER

Maria M. Kapusciniski, Carmel; Benjamin J. Kaufman, Wappingers Falls, and Christopher S. Liu, Poughkeepsie, all of N.Y., assignors to Texaco Inc., White Plains, N.Y.

Filed Aug. 20, 1984, Ser. No. 642,314

Int. Cl.[4] C10M *149/04;* C08F *26/02*

U.S. Cl. 252—50 **12 Claims**

1. A graft polymer comprising an oil-soluble, substantially linear, carbon-carbon backbone polymer having graft polymerized thereon units derived from allyl amine.

4,715,976

ELECTROLYTE SOLUTION FOR ELECTROLYTIC CAPACITOR

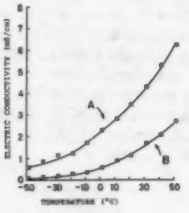
Shoichiro Mori, and Makoto Ue, both of Ibaraki, Japan, assignors to Mitsubishi Petrochemical Co., Ltd., Tokyo, Japan

Filed Dec. 19, 1986, Ser. No. 943,728

Claims priority, application Japan, Dec. 20, 1985, 60-286980; Dec. 20, 1985, 60-286982; Apr. 28, 1986, 61-98673

Int. Cl.[4] H01G *9/02*

U.S. Cl. 252—62.2 **9 Claims**



1. An electrolyte solution for use in an electrolytic capacitor, said solution comprising as a solute at least one quaternary ammonium salt of a carboxylic acid selected from the group consisting of

(a) quaternary ammonium salts of at least one of maleic acid and citraconic acid wherein the mole ratio of acid to ammonium is substantially 1/1,

(b) quaternary ammonium salts of aromatic carboxylic acids, wherein the mole ratio of acid to ammonium is 1/1 to 4/1 for monocarboxylic acids, substantially 1/1 for dicarboxylic acids, 0.33/1 to 1.33/1 for tricarboxylic acids and 0.25/1 to 1/1 for tetracarboxylic acids, and

(c) quaternary ammonium salts of branched-chain aliphatic dicarboxylic acids having 11 to 30 carbon atoms in total.

4,715,977

MAGNETIC COATING COMPOSITIONS FROM CARBOXYLIC ACID-GRAFTED PHENOXY RESINS

George A. Salensky, Hunterdon County, N.J., assignor to Union Carbide Corporation, Danbury, Conn.

Division of Ser. No. 725,535, Apr. 22, 1985, Pat. No. 4,638,038. This application Oct. 2, 1986, Ser. No. 914,794

Int. Cl.[4] C04B *35/04;* H01F *1/00*

U.S. Cl. 252—62.54 **11 Claims**

1. A magnetic coating composition for magnetic recording media comprising:

(a) a phenoxy resin having pendant secondary hydroxyl groups of which about 3 to about 50% of such hydroxyl groups have been reacted to produce moieties having pendant carboxyl groups,

(b) a magnetic powder, and

(c) an organic solvent.

4,715,978

HEAT STORAGE COMPOSITION, LATENT HEAT STORAGE CAPSULES CONTAINING SAID HEAT-STORAGE COMPOSITION AND TEMPERATURE CONTROL APPARATUS USING SAID CAPSULES

Naomichi Yano, Takarazuka; Tadatsugu Ueno, Osaka, and Shigeru Tsuboi, Amagasaki, all of Japan, assignors to Kubota Tekko Kabushiki Kaisha, Osaka, Japan

Filed Apr. 10, 1986, Ser. No. 850,100

Int. Cl.[4] C09K *5/06*

U.S. Cl. 252—70 **5 Claims**

1. A heat storage composition containing calcium chloride hexahydrate as the main component, which contains, as nucleating agents for preventing supercooling, 0–5 percent by weight (on the whole heat storage composition basis) of barium sulfide, 0.001–5 percent by weight (on the same basis) of barium chloride dihydrate and 0.001–0.1 percent by weight (on the same basis) of strontium chloride hexahydrate.

4,715,979

GRANULAR DETERGENT COMPOSITIONS HAVING IMPROVED SOLUBILITY

Jeffrey E. Moore; Brett A. Evans, and Richard Hansen, all of Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Continuation of Ser. No. 785,933, Oct. 9, 1985, abandoned. This application Oct. 9, 1986, Ser. No. 916,985

Int. Cl.[4] C11D *1/12, 1/755*

U.S. Cl. 252—91 **24 Claims**

1. A granular rapidly dissolving detergent composition prepared by:

(1) forming base granules comprising, by weight:

(a) from about 30% to about 85% of a mixture of a C_{11}–C_{13} alkylbenzene sulfonate surfactant and a C_{12}–C_{16} alkyl sulfate surfactant in a weight ratio of sulfonate surfactant to sulfate surfactant of from about 4:1 to about 1:4;

(b) an alkali metal silicate having a molar ratio of SiO_2 to alkali metal oxide of from about 1.0 to about 3.2; the weight ratio of (a) to (b) being from about 1.5:1 to about 6:1;

(c) from about 10% to about 60% of sodium sulfate; and

(d) from 0% to about 20% of a pyrophosphate or anhydrous Form I tripolyphosphate detergent builder material, or mixtures thereof; said base granules prepared by drying an aqueous slurry comprising the above components;

(2) admixing said base granules with from 0% to about 300%, by weight of the base granules, of a detergent builder material;

(3) compacting said admix at a pressure of from about 20 to about 200 psi;

(4) granulating the resulting compacted admix; and

(5) admixing an additional 0% to about 300%, by weight of

the base granules, of a detergent builder material; said composition having a bulk density of from about 0.55 to about 1.2 g/cc and an average particle size of from about 20 to about 1500 microns.

24. A laminated laundry product comprising two plies of water insoluble tissue in which:

(1) at least one ply is water permeable;

(2) at least one ply defines more than one cup, each cup being surrounded by a rim of that ply;

(3) the second ply is sealed to the first ply at least at the rims of the cups to physically separate the cups so that the contents of the cups remain in place; and more than one cup contains the product of claim 1.

4,715,980

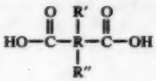
ANTIMICROBIAL SANITIZING COMPOSITION CONTAINING N-ALKYL AND N-ALKENYL SUCCINIC ACID AND METHODS FOR USE

John A. Lopes, and James H. Stanton, both of Grosse Ile, Mich., assignors to Diversey Wyandotte Corporation, Wyandotte, Mich.

Filed Mar. 17, 1986, Ser. No. 840,336
Int. Cl.[4] C11D 3/48
U.S. Cl. 252—106 **26 Claims**

1. An antimicrobial concentrate composition capable of being diluted with a major amount of water to form an antimicrobial solution, the concentrate composition comprising:

(a) a dicarboxylic acid having the general formula:



wherein R is a saturated or unsaturated hydrocarbon moiety having two carbons; R′ is a substituted or unsubstituted n-alkyl or n-alkenyl moiety having between about 6 and about 12 carbon atoms; and R″ is a substituent selected from the group consisting of hydrogen and alcohol, the dicarboxylic acid being present in an amount between about 0.25 and about 25 percent by weight based on the total weight of the concentrate;

(b) a solubilizer present in an amount between about 0.25 and about 20 percent by weight based on the total weight of the concentrate;

(c) an acid present in an amount capable of yielding a solution pH below about 5.0 upon dilution of the concentrate to a use solution; and

(d) an anionic diluent, the diluent selected from the group consisting of alcohols, water and mixtures thereof, the diluent being present in an amount between about 10.0 and about 95 percent by weight based on the total weight of the concentrate.

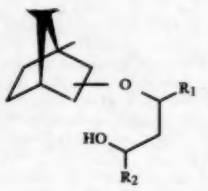
4,715,981

PROCESS FOR AUGMENTING OR ENHANCING THE AROMA OF DETERGENTS USING MIXTURES OF HYDROXYBORNYLOXYBUTANES

Futoshi Fujioka, Wanamassa; Richard M. Boden, Ocean, and William L. Schreiber, Jackson, all of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

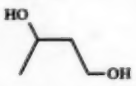
Division of Ser. No. 837,348, Mar. 7, 1986, Pat. No. 4,668,431, which is a continuation-in-part of Ser. No. 784,618, Oct. 4, 1985, Pat. No. 4,620,041, which is a division of Ser. No. 644,054, Aug. 24, 1984, Pat. No. 4,619,780, which is a division of Ser. No. 574,150, Jan. 26, 1984, Pat. No. 4,521,634, which is a continuation-in-part of Ser. No. 533,915, Sep. 19, 1983, Pat. No. 4,532,364, which is a continuation-in-part of Ser. No. 507,292, Aug. 1, 1983, abandoned. This application Jan. 9, 1987, Ser. No. 2,021
Int. Cl.[4] C11D 3/50
U.S. Cl. 252—174.11 **3 Claims**

1. A process for augmenting or enhancing the aroma of a solid or liquid anionic, cationic, nonionic or zwitterionic detergent comprising the step of adding to said solid or liquid anionic, cationic, nonionic or zwitterionic detergent, an aroma augmenting or enhancing quantity of a mixture of compounds defined according to the generic structure:



wherein in the mixture in each of the compounds one of R_1 or R_2 is methyl and the other of R_1 and R_2 is hydrogen produced according to the process of reacting camphene having the structure:

with 1,3-butanediol having the structure:



in the presence of an acid catalyst.

4,715,982

COSMETIC COMPOSITION FOR GENTLE CLEANSING, ESPECIALLY FOR REMOVING EYE MAKEUP

Arlette Zabotto, Paris, and Jean-Claude Contamin, Morangis, both of France, assignors to L'Oreal, Paris, France

Filed Oct. 28, 1986, Ser. No. 925,135
Claims priority, application France, Oct. 31, 1985, 85 16193
Int. Cl.[4] C11D 3/32
U.S. Cl. 252—174.17 **11 Claims**

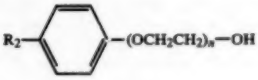
1. A cosmetic composition suitable for gentle cleansing which comprises:

(1) from 0.2 to 3% by weight of at least one active substance which is a nonionic surface-active agent which is a compound of formula (I):

$$R_1—(OCH_2CH_2)_n—OH$$

wherein R_1 is a fatty chain containing from 8 to 18 carbon atoms and n is from 8 to 25, or a compound of formula (II):

(II)



wherein

R_2 is a C_8–C_{16} alkyl residue and

n is from 10 to 40;

(2) from 0.02 to 10% by weight of at least one nonionic

polymer which is a poly-β alanine, a C_1–C_3 alkyl cellulose, a hydroxy C_1–C_3 alkyl cellulose or a hydroxypropylated derivative of guar gum; and a cosmetically acceptable adjuvant, the above percentages being based on the total weight of the composition.

4,715,983

METHOD OF STORING A SOLID CHLORINATING AGENT

Masanori Ota, Chiba, and Hitoshi Sasahara, Tokyo, both of Japan, assignors to Nissan Chemical Industries, Ltd., Japan

Filed Dec. 16, 1985, Ser. No. 809,005

Claims priority, application Japan, Dec. 18, 1984, 59-266737

Int. Cl.[4] C11D *7/54, 3/48;* **B65D** *81/24;* **B01D** *53/04*

U.S. Cl. 252—186.35 **8 Claims**

1. A method of storing a solid chlorinating agent or a composition containing a solid chlorinating agent, comprising storing a solid chlorinating agent or a composition thereof under the ambient atmosphere together with a storage stabilizer consisting of alumino-silica gel obtained from allophane and active carbon, said stabilizer being prepared from the two components via such steps as kneading, granulation and drying.

4,715,984

LIQUID-CRYSTALLINE DIHYDROAZINES

Joachim Krause, Dieburg; Wächtler, Griesheim, and Bernhard Scheuble, Alsbach, all of Fed. Rep. of Germany, assignors to Merck Patent Gesellschaft mit beschraankter Haftung, Darmstadt, Fed. Rep. of Germany

Filed Jan. 22, 1986, Ser. No. 821,195

Claims priority, application Fed. Rep. of Germany, Jan. 22, 1985, 3501849

Int. Cl.[4] C09K *19/34;* **G02F** *1/13;* **C07D** *265/06, 279/06, 319/06, 339/08, 413/12, 417/12*

U.S. Cl. 252—299.61 **18 Claims**

1. A liquid crystalline phase comprising at least two liquid crystalline components at least one of which is a 5,6-dihydroazine derivative of the formula

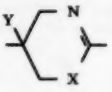
$$R^1—A^1—Z^1—A^2—R^2$$

wherein

each of R^1 and R^2 independently is alkyl of 1–15 C atoms, or alkyl of 1–15 C atoms in which one or two nonadjacent CH_2 groups are replaced by —O—, —CO—, —O—CO—, —CO—O— or —CH=CH—, and one of R^1 and R^2 can also be H, F, Cl, Br, CN, or $R^3—A^3—Z^2$,

A^1 is —A—, —A^4—A—, or —A—A^4—,

A is



X is O or S,

Y is H, C_1–C_4-alkyl, F, Cl, Br, or CN,

each of A^2, A^3 and A^4 independently is a 1,4-cyclohexylene, 1,3-dioxane-2,5-diyl or a 1,3-dithiane-2,5-diyl group; is one of said three groups substituted, respectively, in the 1- or 4, 2- or 5-, or 2- or 5-position, by C_1–C_4-alkyl, F, Cl, Br, CF_3, or CN; is a piperidine-1,4-diyl, 1,4-bicyclo-[2.2.2]-octylene A or 1,4-phenylene group; or is a 1,4-phenylene group substituted by one or two F, Cl, CH_3 or CN groups, or one of said phenylene groups in which one or two CH groups may also be replaced by N;

each of Z^1 and Z^2 independently is —CO—O—, —O—CO—, —CH_2CH_2—, —CHCN—CH_2—, —CH_2—CHCN—, —CH=CH—, —OCH_2—, —CH_2O—, —CH=N—, —N=CH—, —NO=N—, —N=NO— or a single bond and

R^3 is alkyl of 1–15 C atoms, alkyl of 1–15 C atoms in which one or two nonadjacent CH_2 groups are replaced by —O—, —CO—, —O—CO—, —CO—O— or —CH=CH—, or H, F, Cl, Br, or CN,

and wherein all substituted and unsubstituted rings are selected from Cy: a 1,4-cyclohexylene group, Oaz: a 5,6-dihydro-1,3(4H)-oxazine-2,5-diyl group, Taz: a, 5,6-dihydro-1,3-(4H)-thiazine-2,5-diyl group, Dio: a 1,3-dioxane-2,5-diyl group, Dit: a 1,3-dithiane-2,5-diyl group, Bi: a bicyclo[2.2.-2]octylene group, Pip: a piperidine-1,4-diyl group, Phe: a 1,4-phenylene group, Pyr: a pyrimidine-2,5-diyl group or Pyn: a pyridazine-3,6-diyl group.

4,715,985

COMPOSITION FOR CHECKING THE FUNCTIONING OF FIRE DETECTION INSTALLATIONS AND APPLICATION TO VARIOUS TYPES OF DETECTORS

Jean-Louis Pean, Montlhery; Catherine Desvard, Maurepas, both of France, and Jean-Paul Barbier, Chicago, Ill., assignors to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procédés George Claude, Paris, France

Filed Oct. 30, 1985, Ser. No. 793,085

Claims priority, application France, Oct. 30, 1984, 84 16562

Int. Cl.[4] C09K *3/30*

U.S. Cl. 252—305 **10 Claims**

1. A composition for checking the functioning of fire detection installations comprising trifluorotrichloroethane, nitrous oxide, ethyl ether, and an alkyl phthalate selected from the group consisting of ethyl phthalate and butyl phthalate.

4,715,986

PARTICLES, MODIFIED AT THEIR SURFACE BY HYDROPHILIC AND HYDROPHOBIC GROUPS

Burghard Grüning; Ulrich Holtschmidt; Goetz Koerner, all of Essen, and Gerd Rossmy, Haltern-Lavesum, all of Fed. Rep. of Germany, assignors to Th. Goldschmidt AG, Essen, Fed. Rep. of Germany

Filed Mar. 26, 1985, Ser. No. 716,031

Claims priority, application Fed. Rep. of Germany, Mar. 30, 1984, 3411759

Int. Cl.[4] B01J *13/00;* **C09C** *3/00*

U.S. Cl. 252—315.2 **10 Claims**

1. Particles comprising fragments having a size of less than 100 μm, said fragments being insoluble in organic solvents and water and having on one side thereof hydrophilic groups and on the other side thereof hydrophobic groups, said hydrophilic and hydrophobic groups being distributed anisotropiclaly in a non-statistical manner, in separate hydrophilic and hydrophobic domains on the surface of said fragments.

4,715,987

METHOD OF TREATING PHYLLOSILICATES

Hermann L. Rittler, Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.

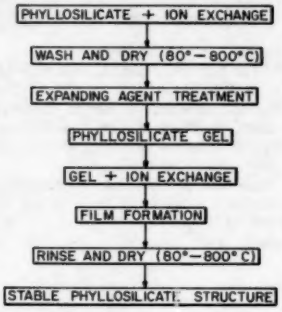
Filed May 12, 1986, Ser. No. 861,939

Int. Cl.[4] B01J *13/00*

U.S. Cl. 252—315.5 **13 Claims**

1. A method of forming a product from a naturally-occurring phyllosilicate which comprises exposing the phyllosilicate to a source of exchangeable ions to effect a change in the chemical makeup of the phyllosilicate interlayer by ion transfer, exposing the ion-exchanged phyllosilicate to an expanding agent selected from the group consisting of a primary amino-

carboxy acid, lysine orotate, and glycylglycine to expand the cell structure and cause gel formation, flocculating the gel,



forming gel-floc interface, and withdrawing flocculated gel from the gel-floc interface.

4,715,988

STANDARD FOR ANALYSIS

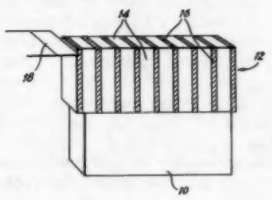
David Colin, South Glamorgan, Wales, assignor to Amersham International plc., Buckinghamshire, England

Filed Feb. 7, 1985, Ser. No. 699,395

Claims priority, application United Kingdom, Feb. 7, 1984, 8403128

Int. Cl.[4] C09F 7/00; G01N 31/00

U.S. Cl. 252—408.1 14 Claims



1. A block of polymeric material for the preparation of standards for analysis, the block including at least two label layers, each label layer being of uniform thickness and containing a known concentration of a label material uniformly distributed therein and different layers containing different concentrations of the label material.

4,715,989

COATING FOR EMI SHIELDING

F. Ryan Sullivan, Cleveland Heights, and David M. Aleksa, Parma, both of Ohio, assignors to The B.F. Goodrich Company, Akron, Ohio

Filed Jan. 22, 1986, Ser. No. 821,310

Int. Cl.[4] H01B 1/06

U.S. Cl. 252—512 23 Claims

1. An electrically conductive water based, air dried, paint having a cured surface resistivity of less than about 10 Ω/square comprising: metallic flake selected from a group consisting of copper, silver, iron phosphide, gold, nickel, mixtures thereof, and substrates coated therewith, the flakes having a thickness of not more than about 3 microns and a long dimension of at least about 10 microns but not intended for applying the paint;

polymeric latex, the polymer having a molecular weight of at least about 90,000, a backbone, and pendant acidic functional moieties in the backbone in sufficient quantity to provide the polymer with an acid number of at least about 7 but not more than about 195, the latex being present in the paint in a ratio of about 15% by weight to about 100% by weight (Polymer basis) of the retallic flake present in the paint;

an air drying, co-solvent having a boiling point greater than water and being capable of agglomerating particles of the latex polymer to form a coherent coating upon a surface being painted in a quantity of at least 2% by weight and 20% by weight of polymer in the latex;

a pH adjusting compound in a quantity sufficient to adjust the pH of the paint to between about 5 and 11; and

at least one non-silicone, non-silicate based film forming enhancer in a quantity of between about 1% by weight and 5% by weight of the metallic flake present in the paint.

4,715,990

STABLE SOIL RELEASE PROMOTING LIQUID DETERGENT CONTAINING STABILIZED ENZYMES

Michael C. Crossin, Kendall Park, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Continuation of Ser. No. 539,080, Oct. 5, 1983, abandoned. This application Jan. 21, 1986, Ser. No. 821,572

Int. Cl.[4] C11D 3/37, 3/386, 17/08; D06M 15/507

U.S. Cl. 252—551 6 Claims

1. A stable soil release promoting enzyme-containing liquid detergent comprising a detersive proportion, in the range of 25% to 40%, of a nonionic detergent, a detergent supplementing and fluorescent brightener substantivity increasing proportion, in the range of 1 to 8%, of sodium higher fatty alcohol polyethoxylate sulfate detergent, a soil release promoting proportion, in the range of 0.5 to 5%, of a soil release promoting polymer of polyethyene terephthalate and polyoxyethylene terephthalate of a molecular weight in the range of about 15,000 to 50,000, wherein the polyoxyethylene of the polyoxyethylene terephthalate is of a molecular weight in the range of about 1,000 to 10,000, and with the molar ratio of ethylene terephthalate to polyoxyethylene terephthalate units being within the range of 2:1 to 6:1, an enzymatically hydrolyzing proportion, within the range of 0.005 to 0.1% (active basis) of enzyme, which enzymatically hydrolyzes proteinaceous soil or proteinaceous and amylaceous soils on fabrics during washing thereof with an aqueous washing solution of the liquid detergent, a stabilizing proportion, within the range of 0.2 to 2%, of a stabilizer for the enzyme(s), and an aqueous medium, in which the pH is in the range of about 6 to 9 and in which there is present no more than 2% of water soluble ionizable material other than the higher fatty alcohol polyethoxylate sulfate detergent.

4,715,991

AQUEOUS HIGH CONCENTRATION SURFACTANT SLURRY CONTAINING AN OLEFIN SULFONATE

Yoshie Hirakouchi; Osamu Toisawa, both of Chiba, and Masatoshi Takahashi, Fujisawa, all of Japan, assignors to Lion Corporation, Tokyo, Japan

Filed Apr. 4, 1986, Ser. No. 848,051

Claims priority, application Japan, Apr. 26, 1985, 60-90471

Int. Cl.[4] C11D 1/14; B01F 17/02

U.S. Cl. 252—555 2 Claims

1. An aqueous high concentration surfactant slurry having a viscosity of 150 poise or less at room temperature comprising:

(A) 50% to 75% by weight of C_{12}–C_{20} olefin sulfonates substantially composed of 8 to 60 parts by weight of at least one vinylidene olefin sulfonate and 92 to 40 parts by weight of at least one linear olefin sulfonate;

(B) 1% to 5% by weight of sodium chloride, potassium chloride, or a mixture thereof;

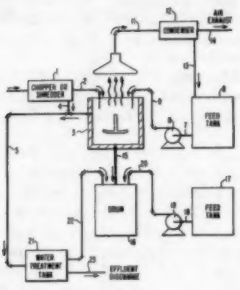
(C) 0.3% to 5% by weight of at least one nonionic substance selected from the group consisting of (C-1) polyoxypropylene glycols having an average molecular weight of 170 to 300, (C-2) ethylene oxide addition products of secondary higher alcohols having a C_7–C_{18} alkyl group and an

average addition mole number of ethylene oxide of 7 to 12, and (C-3) addition products of ethylene oxide having, an average addition mole number of 3 to 10and propylene oxide having an average addition mole number of 1 to 9 of secondary higher alcohols having a C_7–C_{18} alkyl group provided that the total addition mole number of the ethylene oxide and the propylene oxide is 6 to 12.

4,715,992
FILTER ELEMENT REDUCTION METHOD

Thomas S. Snyder, Oakmont; Herbert A. Burgman, Murrysville, and Edward Mitchell, Wilkinsburg, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Oct. 30, 1955, Ser. No. 793,040
Int. Cl.[4] G21F *9/16, 9/04*
U.S. Cl. 252—628 **16 Claims**



1. A method of reducing the bulk volume of material which comprises a phenolic resin and which contains addition polymerizable groups, comprising:

(A) contacting said material, including said phenolic resin, with sufficient butyrolactone to dissolve soluble organic material therein, including said phenolic resin and form a mixture;

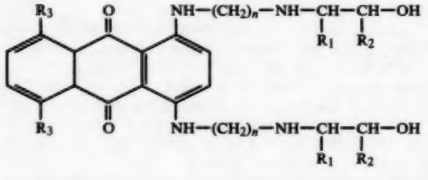
(B) adding about 0.1 to 2% by weight, based on said mixture weight, of an addition polymerization catalyst, whereby said addition polymerizable groups are polymerized and said mixture is solidified.

4,715,993
PROCESS FOR PREPARING CERTAIN 1,4-DI[ω-(2-HYDROXYETHYLAMINO)ALKYLAMINO]ANTHRAQUINONE FREE BASES

Keith C. Murdock, Pearl River, N.Y., and Richard L. Webb, Darien, Conn., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 476,901, Mar. 18, 1983, Pat. No. 4,526,788. This application Jun. 14, 1985, Ser. No. 744,701
Int. Cl.[4] C07C *97/24, 97/26*
U.S. Cl. 260—380 **3 Claims**

1. The process of preparing a free base of the formula:



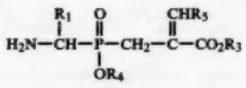
wherein n is 2 or 3, R_1 is hydrogen or methyl, R_2 is hydrogen or methyl, and R_3 is hydrogen or hydroxy which comprises introducing gaseous ammonia or methylamine into a suspension of an acid-addition salt of said base in anhydrous methanol or ethanol or a mixture thereof at 0° C.–20° C. for a period of time sufficient to substantially convert the acid-addition salt to the free base.

4,715,994
NOVEL ANTIBACTERIAL AGENTS AND POTENTIATORS OF CARBAPENEM ANTIBIOTICS

William H. Parsons, Rahway; William R. Schoen, Edison; Arthur A. Patchett, Westfield, all of N.J., and Masao Taniguchi, Machida, Japan, assignors to Merck & Co., Inc., Rahway, N.J.

Filed Nov. 5, 1986, Ser. No. 927,028
Int. Cl.[4] C07F *9/30, 9/32*; A01N *31/02, 57/12*
U.S. Cl. 260—502.5 E **8 Claims**

1. A compound of the formula:



II

wherein:

R_1 is H, CH_3;

R_5 is

(a) hydrogen,

(b) C_1–C_{12} linear or branched alkyl;

(c) C_2–C_{12} linear or branched monoalkenyl;

(d) C_7–C_{20} aralkyl, wherein the alkyl chain is linear or branched C_1–C_8;

(e) heterocyclylalkyl, wherein the alkyl chain is linear or branched C_1–C_8 and the heterocyclyl ring is 5–6 membered, optionally fused with a benzene ring, fully aromatic, containing 1–2 O, N or S heteroatoms;

wherein said above values for R_5 can be substituted by one or more: halo, hydroxy, carboxy, C_1–C_4 alkoxycarbonyl, C_7–C_{16} arylalkoxycarbonyl, C_3–C_7 cycloalkyl, C_1–C_4 alkoxy, C_6–C_{12} aryloxy, amino, mono- or di-C_1–C_8 alkylamino, thio, C_1–C_4 alkylthio, C_6–C_{12} arylthio, C_7–C_{16} aralkylthio, or the radical —S—$(CH_2)_n$—CH(NH_2.)COOH, where n = 1–2; with the proviso that R_5 is at least C_2 alkyl if substituted by one of the above-defined thio groups, and wherein the aryl or aromatic heterocyclyl rings can be further substituted by C_1–C_4 linear or branched alkyl, trihalomethyl, nitro, cyano, halo, or sulfonamido;

R_3 and R_4 are hydrogen, C_1–C_4 alkyl, C_6–C_{12} aryl or C_7–C_{16} aralkyl;

and including stereoisomers and racemates thereof.

4,715,995
PROCESS FOR THE PREPARATION OF ALKALI METAL AND ALKALINE EARTH SALTS OF BENZALDEHYDE-2,4-DISULFONIC ACID

Hans J. Metz, Heppenheim, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Sep. 13, 1985, Ser. No. 775,744
Claims priority, application Fed. Rep. of Germany, Sep. 17, 1984, 3434038
Int. Cl.[4] C07C *143/38*
U.S. Cl. 260—511 **15 Claims**

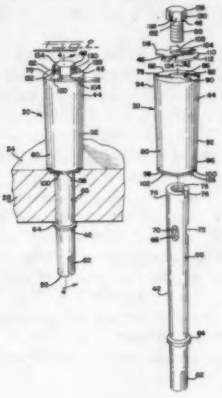
1. A process for the preparation of an alkali metal or alkaline earth metal salt of benzaldehyde-2,4-disulfonic acid from 2,4-dichlorobenzal chloride, which comprises reacting 2,4-dichlorobenzal chloride with an alkali metal or alkaline earth metal sulfite or an alkali metal or alkaline earth metal hydrogensulfite, or a mixture of any of these salts, in the presence of water and an acid-bonding substance at a temperature of 140° C. to below 180° C.

4,715,996

BUBBLE CAP ASSEMBLY

George G. Lambousy, Texas City; Benjamin H. Reaves, West Texas City, and William E. Nelson, Dickinson, all of Tex., assignors to Amoco Corporation, Chicago, Ill.

Filed Oct. 31, 1986, Ser. No. 925,325
Int. Cl.[4] B01F *3/04*
U.S. Cl. 261—114.2 14 Claims



1. A bubble cap assembly for use in a reactor in a hydrocarbon processing plant, comprising:

a tubular riser for injecting hydrocarbons generally upwardly in a reactor, said riser defining a notch providing a riser keyway;

a bubble cap seated upon said riser in an umbrellalike manner for radially distributing the flow of hydrocarbons in a reactor, said bubble cap defining a slot providing a bubble cap keyway;

a keeper comprising a lock washer having at least one bendable locking tab and a key for lockably engaging said bubble cap keyway and said riser keyway; and

a fastener positioned upon said keeper and connected to said riser; and

said locking tab being of a size and shape and having sufficient mechanical strength for securely engaging and locking said fastener to substantially prevent rotation and removal of said fastener during operation of said reactor.

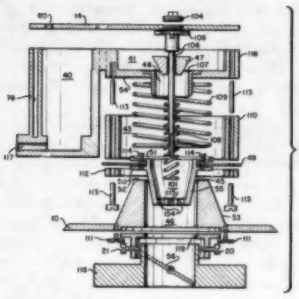
4,715,997

CARBURETION SYSTEM AND METHOD FOR VAPORIZING FUEL AND FOR MIXING VAPORIZED HEATED FUEL WITH AIR TO POWER AN INTERNAL COMBUSTION ENGINE

Terry Boone, 164 N. Blackstone Ave., Fresno, Calif. 93701

Filed Apr. 23, 1986, Ser. No. 855,123
Int. Cl.[4] F02M *15/04*
U.S. Cl. 261—142 5 Claims

1. A carburetion system comprising means for heating and vaporizing fuel for an internal combustion engine including a chamber having fuel inlet means linked to fuel-atomizing means and heating means for vaporizing atomized fuel by direct contact with the fuel; means for holding the heated vaporized fuel formed in said chamber; passage means linking said holding means to said chamber adjacent to said holding means; means for drawing heated vaporized fuel into admixture with air to form a combustible air/fuel mixture; and, atop said chamber, adjustable means for admitting air to said chamber and for driving heated, vaporized fuel mixed with air toward and into means for holding the heated, vaporized fuel



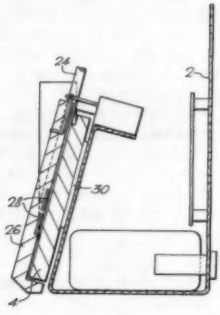
adjacent to means for drawing the heated, vaporized fuel into admixture with air.

4,715,998

INHALATION APPARATUS

Dereck Clow, Keighley, England, assignor to The BOC Group plc, Windlesham, England

Filed Mar. 31, 1986, Ser. No. 845,917
Claims priority, application United Kingdom, Apr. 4, 1985, 8508920
Int. Cl.[4] B01F *3/04;* A61M *15/00*
U.S. Cl. 261—142 2 Claims



1. An apparatus for delivering humidified gas to a patient comprising a humidifying module including a reservoir and releasably attached to a heater unit and when so attached occupying a plane at an angle with the vertical, the module including a substantially flat back plate and a front plate spaced therefrom, means for clamping the back plate and the front plate together to define a gas tight humidifying chamber, a substantially flat wick accommodated within the humdifying chamber, the wick being made from material that absorbs water without any significant change in its surface area, an inlet for dry gas and an outlet for humidified gas both formed in the front plate for communication with the interior of the humidifying chamber.

4,715,999
PROCESS OF MAKING OPTICAL BLANKS

Helmut Dislich, Budenheim; Nanning J. Arfsten, Bischofsheim; Helmut Schmidt, Hoechberg; Gottfried Philipp, Kist, and Gerhard Tuenker, Wuerzburg, all of Fed. Rep. of Germany, assignors to Schott Glaswerke, Munich, Fed. Rep. of Germany

Filed Nov. 8, 1985, Ser. No. 796,460

Claims priority, application Fed. Rep. of Germany, Nov. 7, 1984, 3440652

Int. Cl.[4] B29D *11/00*

U.S. Cl. 264—1.1 **14 Claims**

1. A method of producing an essentially nonswelling optical blank from a granulate or powder of polyorganoheterosiloxane, comprising subjecting said polyorganoheterosiloxane to hot-blank pressing to form said optical blank wherein during said hotblank processing step, the polymer is further polymerized and the resultant optical blank is essentially non-swelling in water and does not require a grinding step, said polyorganoheterosiloxane having been produced in a solvent reaction medium by hydrolytic preliminary condensation of

(a) at least one compound, soluble in the reaction medium, of formula I

$$MR_4 \qquad (I)$$

in which M represents titanium, zirconium or tin and R represents halogen, carbonate, hydroxy, alkoxy, acyloxy or a chelate liquid; and

(b) at least one organofunctional silane of formula II

$$R'_m(R''Y)_nSiX_{(4-m-n)} \qquad (II)$$

in which R' is a radical representing alkyl, alkenyl, aryl, arylalkyl, alkylaryl, arylalkenyl or alkenylaryl, R'' represents alkylene, arylene, alkylenearylene, alkenylene or alkenylenearylene, and wherein said radical is optionally substituted by oxygen or sulphur atoms or by —NH-groups, X represents hydrogen, halogen, hydroxy, alkoxy, acyloxy or the group $—NR'''_2$ wherein R''' represents hydrogen and/or alkyl, Y represents methacryloxy-, epoxy- or vinyl-group, with m and n having the value 0, 1, 2 or 3 and m+n having the value 1, 2, or 3;

without addition of water or with the addition of a quantity of water which is less than the stoichiometric quantity required for the complete hydrolysis of the existing hydrolyzable groups, and subsequent further condensation by addition of at least the quantity of water which is needed for the hydrolysis of the remaining hydrolyzable groups, in which process, related to the total molar number of the initial components, 20–80 molar % of component (a), 80∝20 molar % of component (b) and 0–50 molar % of component (c) are employed; and

removing said solvent to form said granulate or powder.

4,716,000
PROCESS AND APPARATUS FOR THE PRODUCTION OF A CROSS-LINKED, EXTRUDED OR SPRAYED PRODUCT

Kurt Kerschbaum, Klosterneuburg, and Alfred Konicka, Vienna, both of Austria, assignors to Rosendahl Maschinen Gesellschaft m.b.H., Maria Enzersdorf, Austria

Filed Oct. 22, 1985, Ser. No. 790,255

Claims priority, application Austria, Oct. 22, 1984, 3364/84

Int. Cl.[4] B29C *47/62*

U.S. Cl. 264—83 **4 Claims**

1. A process for producing a cross-linked, extruded or sprayed product, comprising:

(a) feeding components consisting essentially of a cross-linked polymer in the presence of hydrolyzable, unsaturated silane, a free radical which admits an initiator, and a silanol condensation catalyst to a heatable cylinder having first and second ends, said first end receiving said components from a feeding means and said second and delivering said product to a molding means,

said components being admixed by a mechanical worm being rotatably disposed inside said cylinder, said worm being of a two-thread type with a channel formed adjacent to said worm, leading to said molding means, said two-thread worm having,

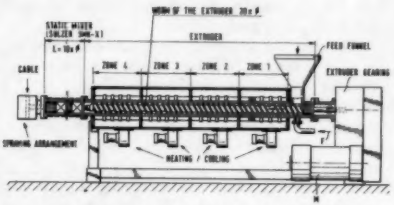
a first spiral groove defined by said threads with a cross-section over the length of said worm decreasing to approximately zero,

a second spiral groove defined by said threads having a cross-section over the length of said worm increasing from approximately zero in the opposite direction of said first spiral groove, and the sum of said cross-sections of said first and second spiral grooves decreasing toward said channel with both spiral grooves having substantially equal gradients, and

said admixed components forming a strand being conveyed in said channel to static mixing means disposed in said channel toward said second end of said cylinder, said static mixing means separating said strand into a plurality of strands with subsequent uniting of said plurality of strands, producing a mixed mass,

(b) raising the temperature during step (a) to enable grafting of said admixed components,

(c) transferring the grafted mixture of steps (a) and (b) to a



mold in the presence of water to cause cross-linking of said grafted mixture, and to form a product.

2. An apparatus for producing a cross-linked, extruded or sprayed product comprising:

means for feeding chemical components of said product;

means for molding said product;

a heatable cylinder having first and second ends, said first end receiving said components from said feeding means and said second end delivering said product to said molding means, said cylinder including,

a mechanical worm being rotatably disposed inside said cylinder to mix said components, said worm being of a two-thread type with a channel formed adjacent to said worm leading to said molding means, said two-thread worm having,

a first spiral groove defined by said threads with a cross-section over the length of said worm decreasing to approximately zero,

a second spiral groove defined by said threads having a cross-section over the length of said worm increasing from approximately zero in the opposite direction of said first spiral groove, and the sum of said cross-sections of said first and second spiral grooves decreasing toward said channel both spiral grooves having substantially equal gradients,

means for static mixing of said components, being disposed in said channel toward said second end of said cylinder.

4,716,001

METHOD OF MAKING A FLEXIBLE CABLE ASSEMBLY

Louis E. Kottke, Adrian, Mich., assignor to Acco Babcock Inc., Fairfield, Conn.

Division of Ser. No. 625,601, Jun. 28, 1984, Pat. No. 4,655,729.
This application Sep. 26, 1985, Ser. No. 780,487
Int. Cl.[4] B28B *11/16*; B29C *61/06, 71/00*
U.S. Cl. 264—145 4 Claims

1. A method of forming a liner for a flexible cable assembly, comprising

(a) forming a flexible generally cylindrical tube with at least one generally longitudinally extending rib on the interior surface of the tube;

(b) cutting the tube to form a helical tubular strip with at least one segment of said rib on each turn therof; and

(c) circumferentially offsetting the rib segments on adjacent turns of the strip.

4,716,002

METHOD OF PRODUCING A FLAME-RETARDANT ACRYLIC COPOLYMER

Masaaki Fujimatsu, and Toshiyuki Kobashi, both of Okayama, Japan, assignors to Japan Exlan Company Limited, Osaka, Japan

Division of Ser. No. 568,922, Jan. 6, 1984, Pat. No. 4,604,428.
This application Jan. 28, 1986, Ser. No. 823,296
Claims priority, application Japan, Jan. 10, 1983, 58-2596
Int. Cl.[4] D01F *6/18*
U.S. Cl. 264—182 6 Claims

1. In a method of producing flame-retardant acrylic fibers, which comprises producing an acrylic polymer, dissolving said acrylic polymer in an inorganic solvent to form a spinning solution, spinning said acrylic polymer in said solution into fibers and after-treating said fibers, the improvement wherein said acrylic polymer is produced by polymerizing, at a temperature of 30° to 60° C., a vinyl monomer containing more than 75 weight % of acrylonitrile, in an aqueous medium containing a radical initiator and a halogen-containing polymer latex substantially free from an emulsifier, said latex containing polymer particles of less than 0.5μ stably dispersed therein, wherein the quantity of said latex is such that the quantity of halogen-containing polymer in said latex is 1.5 to 150 weight % based on the weight of said vinyl monomer.

4,716,003

APPARATUS AND METHOD FOR REDUCING NECK WASTE IN A CAST VINYL SHELL

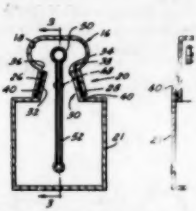
Laurent R. Gaudreau, So. Berwick, Me., assignor to Ex-Cell-O Corporation, Walled Lake, Mich.

Filed May 22, 1986, Ser. No. 865,991
Int. Cl.[4] B29C *41/04, 41/46*
U.S. Cl. 264—302 6 Claims

1. In a method for molding an article by depositing heat gellable material from a powder box joined to a preheated mold through a pour spout on the powder box and through a waste inlet neck on the preheated mold and wherein the joined powder box and mold are rotated as a unit to deposit the heat gellable material on a mold surface the improvement comprising:

maintaining the pour spout on the powder box at a non-gelling temperature below that required to gel any appreciable thickness of material thereon to prevent the deposition of gelled material thereon as it passes thereacross during rotation of the joined powder box and the preheated mold;

shielding the waste inlet neck from powder flow into the heated mold by inserting the pour spout through the waste inlet neck and in overlying relationship thereto whereby the gellable material is bypassed around the waste inlet



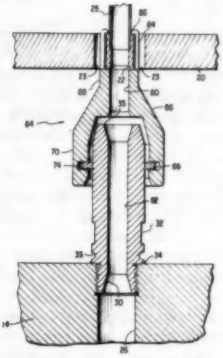
neck as the gellable material is deposited on the mold surface during rotation of the joined powder box and preheated mold.

4,716,004

THIMBLE GUIDE EXTENDER

Daniel Merkovsky, Monroeville, and Michael R. Gasparro, Penn Hills, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Feb. 6, 1986, Ser. No. 826,522
Int. Cl.[4] G21C *17/00*
U.S. Cl. 376—203 12 Claims



1. In a nuclear reactor having a reactor lower core plate with a bore therein and having a thimble guide with a bottom end that is mounted on the reactor lower core plate, a top end that is spaced apart from an aperture in the bottom nozzle of a fuel assembly supported by the core plate, and sides defining an elongated guide channel between the top and bottom ends to accommodate an elongated hollow thimble which is longitudinally movable through the bore and into the aperture, the bottom nozzle having legs which rest on the core plate around the bore and having flow openings adjacent the aperture, and the guide channel having an axis which extends through the bore and the aperture, a thimble guide extender comprising:

a hollow element having a thimble passage with an axis, said hollow element having an upper portion which contacts said bottom nozzle of said fuel assembly and a lower portion which extends around said sides of said thimble guide so that said upper end of said guide is disposed within said hollow element; and

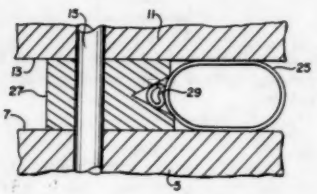
means for mounting said hollow element so that said thimble passage axis is coaxial with respect to said axis of said guide channel, said means for mounting including locking fingers on said upper portion of said hollow element to extend into said flow openings and secure said hollow element to said bottom nozzle.

4,716,005

FORMING A SEAL BETWEEN PLANAR SEALING SURFACES

L. Ike Ezekoye, Wilkinsburg; Edward J. Rusnica, Greensburg, and Henry A. Sepp, Jr., Monroeville Boro, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jan. 21, 1986, Ser. No. 820,356
Int. Cl.[4] G21C *13/00*
U.S. Cl. 376—205 12 Claims



1. A method of forming a seal between the confronting planar sealing surfaces on two annular structural members which are drawn together by axially extending bolts comprising the steps of:

forming a seal assembly by locking a toroidal, crushable seal member within a substantially flat annular spacer member against an annular shoulder formed on the inner diameter thereof with an annular resilient member seated in a radially extending groove in the inner surface of said substantially flat annular member, said flat annular member being axially thinner than said toroidal, crushable seal member;

placing said sealing assembly between said planar sealing surfaces and positively aligning said assembly relative to said axially extending bolts; and

tightening said bolts to draw said planar sealing surfaces toward each other and into contact with the flat annular member while crushing said toroidal, crushable seal member to form a seal between said planar sealing surfaces.

11. In a nuclear reactor, the combination of a generally, cylindrical pressure vessel having a flange extending radially around its upper end which defines an axially facing planar sealing surface and axially extending bores passing through said sealing surface, a substantially hemispherical head having a radially extending flange around its lower end which defines an axially facing planar sealing surface complementary to the sealing surface on the pressure vessel flange and which also defines axially extending bores aligned with the bores in the pressure vessel flange, bolts passing through the bores in the pressure vessel and head flanges to draw said flanges toward each other, and a sealing assembly comprising:

a toroidal, crushable metallic, tubular seal member;

a flat, annular spacer member defining a radially extending V-shaped annular recess in its inner surface and axially extending bores aligned with the bores in said pressure vessel and head flanges through which said bolts pass to position the spacer member relative to said flanges; and

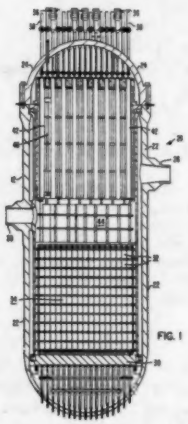
a toroidal coil spring seated in said V-shaped groove and sized to grip and position said toroidal, crushable metallic tubular seal member inside said flat annular spacer, said flat annular spacer being substantially rigid and axially thinner than said seal member such that as said bolts are tightened to draw said flanges toward each other and down against said spacer member, the seal member is crushed between said planar sealing surfaces to form a seal therebetween.

4,716,006

SPECTRAL SHIFT REACTOR CONTROL METHOD

Albert J. Impink, Jr., Murrysville Boro, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Division of Ser. No. 520,087, Aug. 4, 1983, which is a division of Ser. No. 217,054, Dec. 16, 1980, Pat. No. 4,432,930. This application Apr. 23, 1986, Ser. No. 855,239
Int. Cl.[4] G21C *7/26*
U.S. Cl. 376—209 6 Claims



1. The method of operating a pressurized-water fissile-material-fueled spectral-shift nuclear reactor in such manner that short-term reactivity requirement variations can be satisfied without making control rod or chemical shim changes, said reactor including a pressure vessel enclosing a reactor core and having an inlet and an outlet for circulating a water coolant moderator in heat transfer relationship with said core, said core comprising a plurality of fuel assemblies disposed therein for generating heat by nuclear fission, said reactor provided with a plurality of neutron-absorbing control rods which are vertically movable into and out of said core so that movement of said control rods into said core will substantially decrease reactivity and withdrawal of said control rods from said core will substantially increase reactivity, said control rods when inserted into said core displacing an equivalent volume of said water coolant moderator, said reactor also provided with a plurality of neutron-spectral-shift rods which have a lower absorptivity for neutrons than said control rods, said neutron-spectral-shift rods when inserted into said core displacing an equivalent volume of said water coolant moderator, said neutron-spectral-shift rods comprising two different types of rods, a first of said different types of said neutron-spectral-shift rods comprising displacer rods which have a low absorptivity for neutrons, the remainder of said neutron-spectral-shift rods comprising gray rods which have an absorption for neutrons which is intermediate the neutron absorption of said control rods and the low neutron absorption of said displacer rods, each said neutron-spectral-shift displacer rod comprising a hollow thin-walled Zircaloy member containing a filling of solid or annular zirconium- or aluminum-containing material for providing internal support and mass for said thin-walled tubular member, each said displacer rod having overall neutron-absorbing and -moderating characteristics essentially not exceeding those of hollow tubular Zircaloy members with or without a filling of zirconium oxide pellets or aluminum oxide pellets, said neutron-spectral-shift rods being arranged in clusters comprising adjacent neutron-spectral-shift rods, said neutron-spectral-shift rods being vertically movable as individual clusters into and out of said reactor core with the cluster movement being independent of the movement of said control rods, the volume of said water coolant moderator which is

displaced by said displacer rods when fully inserted into said core substantially exceeding the volume of said water coolant moderator which is displaced by said gray rods when fully inserted into said core, the volume of said water coolant moderator which is displaced by said displacer rods when fully inserted into said core substantially exceeding the volume of said water coolant moderator which is displaced by said control rods if fully inserted into said core, and the volume of said water coolant moderator which is displaced by said control rods if fully inserted into said core exceeding the volume of said water coolant moderator which is displaced by said gray rods when fully inserted into said core, said method comprising:

when said reactor is operating with a portion of said clusters of said neutron-spectral-shift rods fully inserted in said core and the remainder of said clusters of said neutron-spectral-shift rods fully withdrawn from said core, compensating for increased short-term reactivity requirements by completely withdrawing previously inserted clusters of said neutron-spectral-shift rods from said core, and compensating for decreased short-term reactivity requirements by completely inserting previously withdrawn clusters of said neutron-spectral-shift rods into said core.

4,716,007

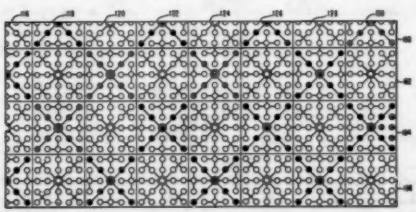
SPECTRAL SHIFT REACTOR

William R. Carlson, Pittsburgh, and Eugene J. Piplica, Levelgreen, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation of Ser. No. 217,061, Dec. 16, 1980, abandoned. This application Dec. 9, 1983, Ser. No. 559,848

Int. Cl.[4] G21C *7/26*

U.S. Cl. 376—209 **6 Claims**



1. A spectral shift pressurized-water reactor comprising:

a pressure vessel enclosing a reactor core which includes fissile material fuel, said pressure vessel having an inlet and an outlet for circulating water coolant moderator in heat transfer relationship with said core, said core comprising a plurality of square-shaped adjacent fuel assemblies vertically disposed therein for generating heat by nuclear fission, and said fuel assemblies having a fuel enrichment which provides a measure of excess reactivity at the beginning of core life which is later drawn upon to lengthen core life;

a plurality of spaced vertical guide tubes disposed in each of said fuel assemblies and adapted to have rod members vertically moved therein and therefrom during reactor operation, and a portion of said guide tubes in each said fuel assembly disposed in a cross-like configuration along the two diagonals which connect the corners of said square-shaped fuel assemblies;

three separate types of rods adapted to be moved into and out of said guide tubes, a first type of said rods comprising neutron-absorbing control rods which are movable into and out of said core so that movement of said control rods into said core will substantially decrease reactivity and withdrawal of said control rods from said core will substantially increase reactivity, a second type of said rods comprising neutron-spectral-shift displacer rods which have a substantially lower absorptivity for neutrons than said control rods, each said neutron-spectral-shift displacer rod comprising a hollow thin-walled Zircaloy member containing a filling of solid or annular zirconium- or aluminum-containing material for providing internal support and mass for said thin-walled tubular member, each said displacer rod having overall neutron-absorbing and -moderating characteristics essentially not exceeding those of hollow tubular Zircaloy members with or without a filling of zirconium oxide pellets or aluminum oxide pellets, the third type of said rods comprising thick walled gray rods each of which have an absorptivity for neutrons intermediate that of each of said control rods and each of said neutron-spectral-shift displacer rods, and said rods all having substantially the same cross-sectional dimension;

said gray rods and said control rods operable to be moved into and out of said core in a portion of said guide tubes which are positioned in said cross-like configuration, and said neutron-spectral-shift displacer rods operable to be moved into and out of substantially all of the remainder of said guide tubes, approximately half of said fuel assemblies operable to have only said neutron-spectral-shift displacer rods moved therein and therefrom, those of said fuel assemblies into which only said neutron-spectral-shift displacer rods are to be moved being alternated in position in said core with those of said fuel assemblies into which said control rods and said gray rods are to be moved, the total number of said neutron-spectral-shift displacer rods very substantially exceeding the total number of said control rods and said gray rods, and the total number of said control rods substantially exceeding the total number of said gray rods;

spider members and associated shafts and drive members therefor positioned above said core, a separate spider member provided for substantially all of each of said fuel assemblies, each of said spider members being separately controllable and having only one type of said rods connected thereto in the form of a rod cluster, said control rods and said gray rods being connected to said spider members in the form of control-rod and gray-rod cross-like clusters to move into said guide tubes which are similarly disposed, and said neutron-spectral-shift displacer rods connected to said spider members as composite clusters which interfit into substantially all said guide tubes in a single fuel assembly in addition to those proximate guide tubes of adjacently positioned fuel assemblies so that those spiders which have said displacer rod clusters connected thereto serve one fuel assembly in addition to proximate portions of those fuel assemblies which are positioned adjacent thereto; and

each said neutron-spectral-shift displacer rod cluster having a total reactivity worth when fully inserted into said core, each said gray rod cluster having a total reactivity worth when fully inserted into said core, and the total reactivity worth of each said neutron-spectral-shift displacer rod cluster substantially exceeding the total reactivity worth of each said gray rod cross-like cluster so that during reactor operation predetermined reactivity worths can be obtained by movement of said displacer rod clusters and said gray rod clusters.

4,716,008

DEVICE FOR CONTROL OF THE CORE OF A NUCLEAR REACTOR

Claude Leroy, Lardy; Jean-Paul Millot, Elancourt, and Guy Desfontaines, Puteaux, all of France, assignors to Framatome & Cie, Courbevoie, France

Filed Jan. 30, 1985, Ser. No. 696,369

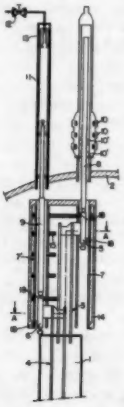
Claims priority, application France, Jan. 30, 1984, 84 01360

Int. Cl.[4] G21C *7/12*

U.S. Cl. 376—237 **8 Claims**

1. In a pressurized water nuclear reactor having a pressure vessel and a core comprising a plurality of vertically arranged adjacent fuel assemblies arranged in a regular array, a control device including a plurality of clusters arranged for insertion

into and removal from the core and each having a plurality of rods connected to a common carrier vertically slidable in a stationary guide structure and connectable to a drive shaft, said clusters comprising first clusters containing neutron absorbing material and each individually associated with electromagnetic actuation means for adjusting the amount of insertion of the associated one of said first clusters and comprising second clusters containing a different material and each individually associated with hydraulic actuation means independent from said electromagnetic actuation means and controllable to cause upward and downward movement of the associated one of said second clusters, means being provided for optionally locking



and unlocking one of said second clusters in a fixed position fully removed from said core, a set of one first cluster and one second cluster being associated with some only of said fuel assemblies, with the drive shafts of the two clusters in each set being non-coaxial and being arranged symmetrically with respect to the axis of a single stationary structure located above the associated fuel assembly and arranged for authorizing mutually independent vertical movement of the first and second clusters, said guide structure including two vertical guide tubes located symmetrically with respect to and at a distance from a vertical axis of the associated fuel assembly, each constructed to guide the carrier of one of the first cluster and second cluster associated with the fuel assembly.

4,716,009

DROPPED ROD PROTECTION INSENSITIVE TO LARGE LOAD LOSS

Francis R. Thaulez, Saint Paul, Belgium, assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Dec. 17, 1985, Ser. No. 809,709
Int. Cl.[4] G21C *7/36*
U.S. Cl. 376—242 **9 Claims**

1. A method of operating the reactor of a nuclear power plant comprising the steps of:

monitoring the rate of change of reactor neutron flux;

shutting down the reactor when the rate of change of neutron flux becomes more negative than a preselected negative value corresponding to that caused by a dropped reactor control rod;

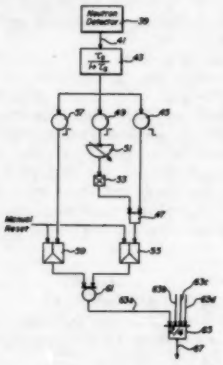
monitoring operation of the nuclear power plant to detect a loss of load of a magnitude which generates a rate of change in neutron flux more negative than said preselected negative value within a predicted period of time after detection of said loss of load; and

inhibiting shutdown of the reactor in response to the rate of change of neutron flux becoming more negative than said preselected value for a predetermined time period after detection of said loss of load, said predetermined time period being longer in duration than said predicted time period.

3. A protection system for the reactor in a nuclear power plant comprising:

means for monitoring the rate of change of reactor neutron flux;

means responsive to a negative rate of change in the neutron flux which is more negative than a preselected negative value for shutting down the reactor; and



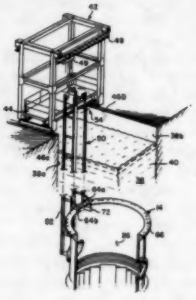
means responsive to a positive rate of change in the neutron flux which exceeds a preselected positive value thereof for inhibiting subsequent operation of said means to shutdown the reactor, whereby the reactor is not shutdown even though a rate of change of the neutron flux becomes more negative than said preselected negative value when the rate of change of said neutron flux has already exceeded said preselected positive value.

4,716,010

TOOLING APPARATUS FOR MODIFYING NUCLEAR REACTORS

Frank G. Gallo, Latrobe; Clark E. Swenson, Monroeville; William A. Bencloski, Hermine; Angelo J. Cassette, Greensburg; John L. Manno, White Oak, and Edward A. Parlak, N. Huntingdon, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Dec. 13, 1983, Ser. No. 561,018
Int. Cl.[4] G21C *19/02*
U.S. Cl. 376—260 **22 Claims**



1. Support apparatus for supporting and selectively locating a tool with respect to its work piece, and the work piece having first and second dimensions, said support apparatus comprising:

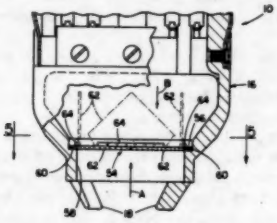
(a) a tool carriage for receiving the tool;
(b) a support structure for supporting and guiding said tool carriage with respect to the workpiece;
(c) first drive means mounted on said support structure and coupled to said tool carriage for selectively driving said tool carriage along said first dimension;
(d) rail means mounted on said tool carriage along said second dimension;
(e) a support table mounted for movement along said rail means;
(f) second drive means mounted on said tool carriage selectively driving the tool along said second dimension, said second drive means mounted on said support table and engaging said tool carriage to drive said support table along said rail means, whereby the tool may be accurately positioned with respect to the work piece; and
(g) clamp means affixed to said support structure for engaging the work piece for suspending said support structure, whereby said support structure extends along said first dimension of said work piece.

13. In a nuclear reactor having a core barrel of a substantially cylindrical configuration with an axis and a plurality of flow holes disposed therethrough, a remotely controlled apparatus for supporting and selectively disposing a tool with respect to the core barrel, said remotely controlled apparatus comprising:
(a) a tool carriage for receiving the tool;
(b) a strongback assembly for supporting and guiding said tool carriage with respect to the core barrel;
(c) clamp means affixed to said strongback assembly for engaging the core barrel for suspending said strongback assembly along a first dimension substantially parallel to the axis of the core barrel;
(d) first drive means mounted on said strongback assembly and coupled to said tool carriage for selectively driving said tool carriage along said first dimension;
(e) a support table;
(f) means mounted on said tool carriage for supporting said support table for movement along an arcuate path corresponding to said cylindrical configuration; and
(g) second drive means on said tool carriage and coupled to said support table for selectively driving said support table along said arcuate path, whereby the tool is accurately positioned with respect to the core barrel.

4,716,011
BWR FUEL ASSEMBLY BOTTOM NOZZLE WITH ONE-WAY COOLANT FLOW VALVE

Rusi P. Taleyarkhan, Pittsburgh, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Oct. 9, 1985, Ser. No. 785,816
Int. Cl.[4] G21C *3/32, 15/00*
U.S. Cl. 376—281 **1 Claim**



1. In a nuclear reactor having a flow of coolant/moderator fluid therein, at least one fuel assembly installed in the fluid flow, said fuel assembly comprising in combination:
a bundle of elongated fuel rods disposed in side-by-side relationship so as to form an array of spaced fuel rods;
an outer tubular flow channel surrounding said fuel rods so as to direct the flow of coolant/moderator fluid along said fuel rods;
bottom and top nozzles mounted at opposite ends of said flow channel and having an inlet and outlet respectively for allowing entry and exit of the flow of coolant/moderator fluid into and from said flow channel and along said fuel rods therein, said bottom nozzle having an annular surface defined therein so as to surround said inlet thereof, said annular surface having circumferentially spaced sectors and circumferentially spaced segments which alternate with said spaced sectors; and
a coolant flow direction control device operatively disposed in said bottom nozzle so as to open said inlet thereof to the flow of coolant/moderator fluid in an inflow direction into said flow channel through said bottom nozzle inlet but close said inlet to the flow of coolant/moderator fluid from said flow channel through said bottom nozzle inlet upon reversal of coolant/moderator fluid flow from the inflow direction;
said coolant flow direction control device being a unidirectional flow check valve positioned across said inlet of said bottom nozzle for sensing the direction of coolant/moderator fluid flow and automatically opening when the flow direction sensed is into said bottom nozzle and closing when the flow direction sensed is out of said bottom nozzle;
said flow check valve including a plurality of outer portions mounted to said respective circumferentially spaced sectors of said bottom nozzle annular surface surrounding said inlet thereof, and a plurality of inner portions being pivotably connected to said respective outer portions for pivotal movement toward and away from one another between lowered and closed and raised open positions;
said inner valve portions, when in their raised positions, extending toward said bottom nozzle in the direction of coolant flow into said bottom nozzle, said inner valve portions being configured to extend in close fitting relationship adjacent to one another and coplanarly across said inlet so as to close said inlet when disposed in their respective lowered positions and to extend in generally parallel relationship to the direction of coolant flow and be located remote from one another so as to open said inlet when disposed in their respective raised positions;
each of said inner valve portions, when in its lowered position, has opposite lateral edge portions that seat on respective surface portions of the two segments located on opposite ends of said sector to which the respective outer portion of said valve is mounted, said inner valve portions in seating on said spaced segments of said bottom nozzle annular surface being stopped by said surface from pivoting past their lowered positions in which they would extend away from said bottom nozzle and allow reverse flow of coolant therefrom;
said inner valve portions being arranged in first and second pairs which are angularly displaced about ninety degrees from one another wherein said inner valve portions of each pair are placed in opposing relation to one another such that one is a mirror image of the other, said inner valve portions located directly opposite to one another in said respective pairs thereof extending generally parallel to one another when in said raised positions.

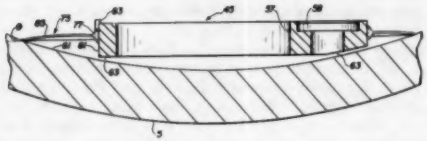
4,716,012
REACTOR INTERNALS LOOSE PARTS STRAINER

Michael R. Gasparro, Penn Hills, and Richard E. Tome, Murrysville, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Oct. 7, 1985, Ser. No. 785,307
Int. Cl.[4] G21C *9/00, 15/00*
U.S. Cl. 376—352 **5 Claims**

1. In combination, an upright cylindrical nuclear reactor pressure vessel having a hemispherical lower head section with a curved inner surface and defining an annular flange extend-

ing radially inward near its upper end, reactor internals suspended within said pressure vessel from said flange, said internals extending downward into said hemispherical lower head section but with the lower end thereof terminating short of contacting the curved inner surface hemispherical lower head section to form a radially extending, annular gap therebetween which varies in size in response to variations in the temperature of reactor coolant circulated through the pressure vessel and



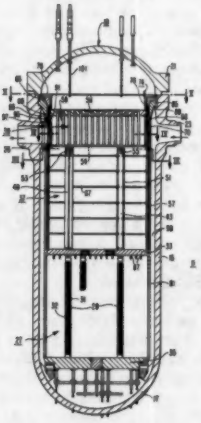
internals due to a difference in the coefficients of thermal expansion thereof, and strainer means comprising an annular member with apertures therethrough smaller than the smallest size of said gap secured to the lower end of said reactor internals and extending radially outward therefrom, over the gap with an outer peripheral edge in contact with the curved inner surface of the hemispherical lower head section for all sizes of said gap to prevent debris from entering and lodging in said gap from above while allowing fluid to pass therethrough.

4,716,013

NUCLEAR REACTOR

Luciano Veronesi, O'Hara Twp., Alleghany Co., and Daniel C. Garner, Murrysville, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation of Ser. No. 490,099, Apr. 29, 1983, abandoned.
This application Feb. 7, 1986, Ser. No. 828,553
Int. Cl.[4] G21C *1/04*
U.S. Cl. 376—353 **19 Claims**



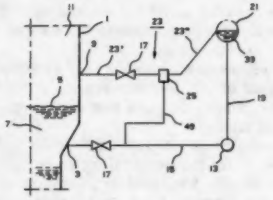
1. A nuclear reactor including a vessel, a nuclear core within said vessel, control-rod assemblies within said vessel, said control-rod assemblies including vertical control-rod guide means in a plenum vertically above said core, said control-rod assemblies also including control-rod clusters, each said cluster including a plurality of control rods suspended from a spider, said cluster being movable to move its said control rods between said guide means and said core, and a drive rod connected to each said cluster for so moving said each cluster, said vessel having at least an inlet nozzle for supplying a coolant through said core, the inflowing coolant after passing through said core flowing predominantly through said guide means generally vertically, a calandria in the path of said outflowing coolant, from said guide means, said calandria including a plurality of hollow members, an upper support for said members perforate to the opening within said members and a lower support, said calandria being mounted with its lower support above and on said guide means and with said drive rods only and not said control rods passing through said hollow members, said lower support being perforate to the coolant flowing out of said guide means, said vessel having at least an outlet nozzle with a generally horizontal coolant outflow channel, said outflow channel being substantially at the level of said calandria so that the coolant flowing into said calandria flows generally transversely over the outer surfaces of said hollow members and out through said outflow channel.

4,716,014

MOISTURE SEPARATOR FOR STEAM GENERATOR LEVEL MEASUREMENT SYSTEM

Bertrand J. Cantineau, Braine l'Alleud, Belgium, assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 11, 1986, Ser. No. 872,986
Int. Cl.[4] G21C *17/00*
U.S. Cl. 376—371 **10 Claims**



1. In a system for measuring the level of liquid in a steam generator comprising:

a lower tap connected to the steam generator at a point below the lowest liquid level to be measured;

an upper tap connected to the steam generator at a point above the highest liquid level to be measured;

a reference leg external to the steam generator extending substantially from the level of the lower tap to a point above the upper tap;

a condensation pot at the upper end of said reference leg in which steam condenses to keep the reference leg filled with water;

a connecting line extending between the condensate pot and the upper tap through which steam passes to the condensate pot and excess liquid from the condensate pot returns; and

pressure responsive means connected to the lower tap and the lower end of the reference leg for generating a signal proportional to the level of liquid in the steam generator;

the improvement comprising;

a separator pot in said connecting line defining an expansion chamber which reduces the velocity of steam and liquid flowing from the steam generator toward the condenstion pot to effect separation of liquid from the steam, said chamber having a low point below the connecting line at which the liquid separated from the steam and the excess liquid from the condensation pot accumulate; and

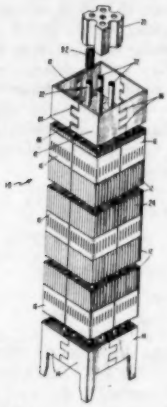
a drain line between the low point in said separator pot and said lower tap through which the liquid separated from the steam and the excess liquid from the condensate pot are returned to said steam generator.

4,716,015

MODULAR NUCLEAR FUEL ASSEMBLY DESIGN

William R. Carlson, Pittsburgh, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed May 15, 1985, Ser. No. 734,372
Int. Cl.[4] G21C 3/32
U.S. Cl. 376—445 21 Claims



1. A fuel assembly for a nuclear reactor core comprising at least two sub-assembly fuel modules, each of said sub-assembly modules containing a plurality of axially extending fuel rods and comprising:

a bottom nozzle module having an associated bottom plate module;

a top nozzle module having an associated top plate module;

at least one guide tube extending between said top and bottom modules;

at least one fuel rod spacer grid module fixed to said guide tube for laterally supporting said fuel rods;

a joining means including an interlocking means for removably securing the top and bottom nozzle modules respectively of adjacent sub-assembly fuel modules together to form an integral assembly from said sub-assembly modules, said joining means being operable to facilitate rapid assembly and disassembly of said fuel assembly into its component sub-assemblies.

4,716,016

UNIVERSAL FUEL ASSEMBLY CONSTRUCTION FOR A NUCLEAR REACTOR

Edmund E. Demario, Penn Hills Twp.; Denis L. Burman, Monroeville; Carl A. Olson, Monroeville, and Jeffrey R. Secker, Monroeville, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Mar. 4, 1985, Ser. No. 708,190
Int. Cl.[4] G21C 3/32
U.S. Cl. 376—446 17 Claims

1. A fuel assembly, comprising in combination:

(a) a rigid fuel assembly skeleton defined by

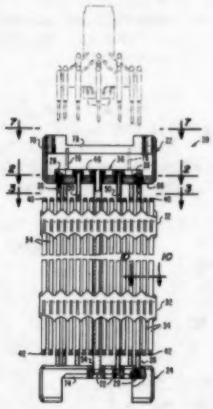
(i) an upper end structure having a plurality of openings defined therein;

(ii) a lower end structure;

(iii) a purality of elongated nonfuel, nonguide thimble, structural members extending longitudinally between and rigidly interconnecting said upper and lower end structures;

(b) a plurality of transverse grids being supported on said elongated structural members of said fuel assembly skeleton at axially spaced locations therealong between said upper and lower end structures thereof;

(c) a plurality of fuel rods extending through and being supported by said grids between said upper and lower end structures of said fuel assembly skeleton so as to extend in generally side-by-side spaced relation to one another and to said elongated nonfuel, structural members of said fuel assembly skeleton, certain groups of said fuel rods in said plurality thereof being spaced apart laterally from one another by a greater distance than the rest of said fuel rods so as to define a plurality of elongated channels extending through said grids and between said upper and lower end structures of said fuel assembly skeleton, said elongated channels thereby being in the form of open spaces extending laterally between said fuel rods of said certain groups thereof and longitudinally between said upper and lower end structures of said fuel assembly skeleton wherein said open spaces are not defined by any physical structure



other than said end structures of said fuel assembly skeleton, said grids and said fuel rods of said certain groups thereof, said plurality of elongated channels being in a pattern which matches that of said plurality of openings in said upper end structure of said fuel assembly skeleton; and

(d) a cluster assembly removably supportable on said fuel assembly skeleton and having a plurality of elongated hollow guide thimbles, said guide thimbles of said cluster assembly extending from said upper end structure of said fuel assembly skeleton through said openings therein and through said elongated channels toward said lower end structure of said fuel assembly skeleton when said cluster assembly is removably supported by said upper end structure of said fuel assembly skeleton.

4,716,017

APPARATUS FOR SECURING STRUCTURAL TUBES IN NUCLEAR REACTOR FUEL ASSEMBLIES

John S. Kerrey, Columbia, S.C., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Division of Ser. No. 637,374, Aug. 3, 1984. This application Oct. 23, 1985, Ser. No. 790,682
Int. Cl.[4] G21C 3/32; B21D 39/00
U.S. Cl. 376—446 11 Claims

1. In a nuclear reactor fuel assembly having a structural tube with a predetermined inside diameter, a generally cylindrical insert of an axial length substantially smaller than the axial length of said structural tube and having a generally cylindrical passageway of a predetermined diameter smaller than said predetermined inside diameter for providing an effectively reduced inside diameter for said structural tube, said insert comprising:

means, having an outside diameter approximately equal to

said predetermined inside diameter, for coaxially centering said insert within said structural tube;

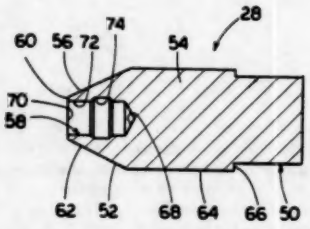
forming lobes, operable when expanded to locally deform against said structural tube thereby locking said insert within said structural tube.

4,716,018

END PLUG WITH TRUNCATED TAPERED LEADING END CONFIGURATION

David A. Boatwright, Columbia, and Wade H. Widener, Cayce, both of S.C., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Nov. 12, 1985, Ser. No. 797,331
Int. Cl.[4] G21C *3/10*
U.S. Cl. 376—451 4 Claims



1. An improved end plug for attachment on an end of a cladding tube of a nuclear fuel rod which facilitates using a gripper tool for loading the fuel rod into a nuclear fuel assembly, comprising:

(a) an inner portion adapted to be inserted into said end of said tube; and

(b) an outer portion adapted to extend from said end of said tube when said inner portion is inserted therein, said outer portion including a body part disposed adjacent said tube end and a leading part disposed remote from said tube end;

(c) said leading part having a hollow interior cavity defined therein, a continuous exterior annular truncated surface defined on a terminal end of said leading part and a continuous exterior annular tapered surface defined on a lateral side of said leading part;

(d) said exterior tapered surface extending between and merging with said body part and said exterior truncated surface and providing sufficient angular inclination so as to facilitate insertion of the end plug when mounted on the fuel rod tube end into the fuel assembly;

(e) said interior cavity in said leading part having an inner end, an outer opening defined at and surrounded by said exterior annular truncated surface and a continuous interior annular wall surface interconnecting said inner end and said outer opening, said interior wall surface being of the same constant diameter from said inner end to said outer opening;

(f) said interior wall surface of said cavity having a continuous undercut annular groove defined therein having a larger diametrical size than that of inner and outer annular portions of said interior wall surface on opposite sides of said groove, said groove being axially spaced from said cavity opening and engageable by the gripper tool fitted through said cavity opening for loading the fuel rod into the nuclear fuel assembly;

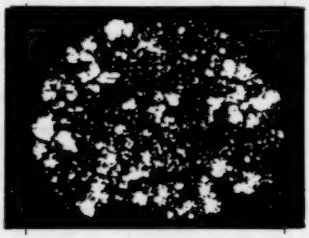
(g) said leading part having a thickness between said exterior tapered surface thereon and said interior cavity undercut groove therein which is less than the radius of said groove and greater than the width of said exterior truncated surface, said interior wall surface of said cavity within said leading part having an axial length between said exterior truncated surface and said undercut groove which is greater than than the axial width of said groove such that said leading part is provided with sufficient wall structure laterally surrounding said interior cavity to react the forces created by engagement of the gripper tool within the cavity groove.

4,716,019

PROCESS FOR PRODUCING COMPOSITE AGGLOMERATES OF MOLYBDENUM AND MOLYBDENUM CARBIDE

David L. Houck, Towanda; David J. Port, and Jen S. Lee, both of Sayre, all of Pa., assignors to GTE Products Corporation, Stamford, Conn.

Filed Jun. 4, 1987, Ser. No. 58,213
Int. Cl.[4] B22F *1/00*
U.S. Cl. 419—17 5 Claims



1. A process for producing composite agglomerates of molybdenum and molybdenum carbide (Mo_2C), said process comprising:

(a) forming a relatively uniform mixture of non-agglomerated molybdenum powder and carbon powder, said carbon powder having a particle size no greater than the size of said molybdenum powder, with the amount of said carbon powder being proportional to the amount of molybdenum carbide desired in said composite agglomerates;

(b) forming a slurry of said mixture, an organic binder, and water with the amount of said binder being no greater then about 2% by weight of said mixture;

(c) agglomerating the powders in said mixture from said slurry;

(d) classifying the resulting agglomerates to remove the major portion of the agglomerates having a size greater than about 170 mesh and less than about 325 mesh from the balance of said agglomerates; and

(e) reacting said balance, the major portion of which has a size in the range of from about −170 mesh to about +325 mesh at a temperature of no greater than about 1400° C. for a sufficient time in a non-carbonaceous vessel in a non-oxidizing atmosphere to form said composite agglomerates.

4,716,020

TITANIUM ALUMINUM ALLOYS CONTAINING NIOBIUM, VANADIUM AND MOLYBDENUM

Martin J. Blackburn, Kensington, and Michael P. Smith, Glastonbury, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Sep. 27, 1982, Ser. No. 424,668
Int. Cl.[4] C22C *14/00*
U.S. Cl. 420—418 11 Claims

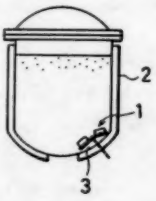
1. A titanium aluminum alloy consisting essentialy of, by atomic percent, 25–27 aluminum, 0.5–4 molybdenum, 7–15.5 niobium, with the balance titanium, wherein the (niobium+-molybdenum) content is between 11 and 16 atomic percent.

4,716,021

HEAT TREATMENT APPARATUS FOR POLYOLEFIN RESIN PARTICLES

Hiroyuki Akiyama, Hiratsuka; Susumu Izawa, Utsunomiya; Shigeru Okabe, Imaichi, and Toru Yamaguchi, Utsunomiya, all of Japan, assignors to Japan Styrene Paper Corp., Tokyo, Japan

Filed Jul. 9, 1986, Ser. No. 883,655
Claims priority, application Japan, Jul. 17, 1985, 60-157493
Int. Cl.[4] B01F *7/06*
U.S. Cl. 422—135 6 Claims



1. An apparatus for the heat treatment of polyolefin resin particles comprising an autoclave having a tilted bottom wall portion and a turbine-type impeller provided over said tilted bottom wall portion such that the rotation of the impeller has an axis of rotation which is inclined with respect to the vertical of the autoclave, said impeller comprising a dome or umbrella-shaped disk and vanes arranged radially on the face or convex side of said disk.

4,716,022

PARTICLE TREATMENT APPARATUS

Joseph B. Priestley, Jr., 13200 N. 103rd Ave., #35, Sun City, Ariz. 85351

Filed Nov. 4, 1985, Ser. No. 794,475
Int. Cl.[4] F27B *17/10*
U.S. Cl. 422—140 2 Claims

1. Particle treatment apparatus including

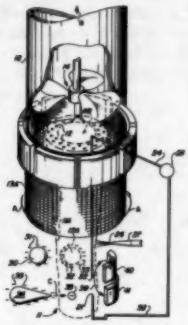
(a) means for forming in a volume of gas a free standing funnel extending downwardly from said means and having a core region and a vortex region of gas circulating around said core region, said means including

(i) a hollow cylindrical member having first and second open ends and a vertical axis, and,

(ii) means for rotating said cylindrical member about said vertical axis to cause gas to circulate around said axis;

(b) means for introducing particles into said vortex region, said vortex region causing said particles to circulate around said vertical axis in confined circular paths of travel generally lying in said vortex region and in a horizontal plane; and,

(c) particle treatment means generally adjacent said funnel for introducing a fluid into said vortex region, said fluid



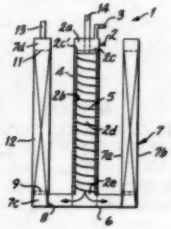
being carried in said circulating gas in said vortex region and coating said particles.

4,716,023

COMPOSITE PARTIAL OXIDIZER AND REFORMER

Larry G. Christner, Newtown, and Steven A. Koehler, Bethel, both of Conn., assignors to Energy Research Corporation, Danbury, Conn.

Filed Nov. 13, 1986, Ser. No. 930,299
Int. Cl.[4] B01J *8/04*
U.S. Cl. 422—149 7 Claims



1. Apparatus comprising:

means for partially oxidizing a hydrocarbon containing fuel comprising: a tubular member having an inner wall; a wick extending along the length of said tubular member adjacent said inner wall; a spiral metallic member including a catalyst disposed thereon, said spiral member being situated adjacent said wick and extending along the length of said tubular member;

a means for receiving said partially oxidized fuel for reforming said partially oxidized fuel and for shift converting said reformed fuel.

4,716,024

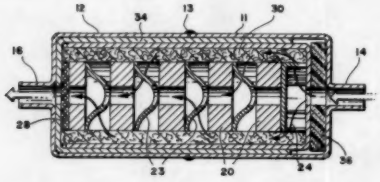
MAGNETIZING HYDROCARBON FUELS AND OTHER FLUIDS

Ivo Pera, Pembroke Pines, Fla., assignor to Goliarda Mugnai Trust, Miami Lakes, Fla.

Filed Jun. 25, 1986, Ser. No. 878,208
Int. Cl.[4] B01J *19/08*; B03C *1/30*; C02F *1/48*
U.S. Cl. 422—186.01 5 Claims

1. Apparatus for magnetically treating fluid comprising hydrocarbon fuels or water comprising a housing having an inlet port and an outlet port attached thereto in substantially coaxial relationship with each other, a plurality of flat circular magnets with an opening at the center thereof positioned

within said housing, said magnets being arranged with surfaces of like polarity adjacent each other, said magnets being separated from each other by a wave washer positioned between adjacent magnets whereby flow of the fluid passed said magnets maximize the exposure of said fluid to the magnetic fields surrounding said magnets, and a circular plate positioned upstream of the first circular magnet, said circular plate having a



flange extending axially therefrom with a plurality of flow openings provided through said flange around the circumference thereof whereby inlet flow within said housing flows radially past said flow openings and into a space surrounding the outer periphery of said circular magnets and between said housing whereby said fluid flow is radially inward past the flat surfaces of said magnets and then axially through said opening at the center of said magnets to said outlet port of said housing.

4,716,025

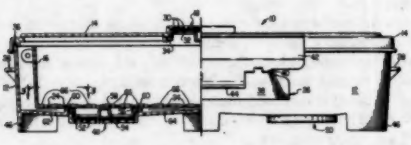
MEDICAL STERILIZATION CONTAINER WITH INSTRUMENT TRAY

Robert L. Nichols, 808 Fort Worth, Jacksonville, Tex. 75766

Division of Ser. No. 668,090, Nov. 5, 1984, Pat. No. 4,617,178. This application Jan. 22, 1986, Ser. No. 821,137

Int. Cl.[4] A61L *3/02*

U.S. Cl. 422—310 **3 Claims**



1. A medical instrument sterilization container, comprising:
a housing for receiving medical instruments for sterilization;
a removable lid sealingly fitted to said housing;
a tray removably disposed within said housing for supporting the medical instruments;
a plurality of apertures defined in a grid pattern in the bottom of said tray to drain condensate therefrom;
said tray having a plurality of raised domed portions, each said raised domed portion having a lowered peripheral area with at least two of said apertures, and wherein each of said domed portions slopes toward said lowered peripheral area in order to facilitate drainage of condensate through said apertures and to provide an irregular surface to minimize surface contact of the instruments with said tray and thus prevent condensate from being trapped under the instruments.

4,716,026

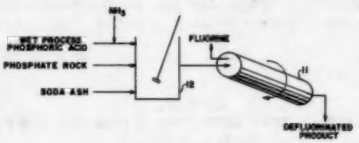
DEFLUORINATION KILN RESTRICTION CONTROL AGENT AND METHOD

James R. Gruber, Lakeland; Ernest A. Gudath, Brandon; Dennis H. Michalski, Lakeland; Robert R. Riddle, Lakeland, and Regis R. Stana, Lakeland, all of Fla., assignors to International Minerals & Chemical Corp., Terre Haute, Ind.

Filed Jan. 22, 1986, Ser. No. 820,503

Int. Cl.[4] C01B *25/16*

U.S. Cl. 423—167 **7 Claims**



1. In a process for thermal defluorination of a mixture of phosphate rock, wet process phosphoric acid and an alkali-containing fluxing agent by feeding said mixture to a thermal defluorination kiln adapted to receive said mixture, the method of preventing the formation of fused ring and ball materials comprising the steps of (1) ammoniating the wet process acid to provide a mole ratio of $NH_3:PO_4$ of from about 0.05 to 0.5 and (2) mixing the ammoniated acid with the rock and the fluxing agent prior to feeding the mixture to the kiln.

4,716,027

METHOD FOR SIMULTANEOUSLY SCRUBBING CEMENT KILN EXHAUST GAS AND PRODUCING USEFUL BY-PRODUCTS THEREFROM

Garrett L. Morrison, Unity, Me., assignor to Passamaquoddy Tribe, A Sovereign Indian tribe recognized by the Government of The United States of America, Thomaston, Me.

Continuation-in-part of Ser. No. 890,991, Jul. 25, 1986, which is a continuation-in-part of Ser. No. 796,075, Nov. 7, 1985, abandoned. This application Sep. 5, 1986, Ser. No. 904,719

Int. Cl.[4] C01B *17/16, 21/00, 17/00*

U.S. Cl. 423—225 **11 Claims**

1. A method of simultaneously scrubbing acidic oxides of sulfur, nitrogen and carbon from the hot exhaust stream from a cement kiln and utilizing acids derived therefrom to produce useful products from the carbonates and oxides of alkali and alkaline earth metals contained as solids in cement kiln dust comprising said carbonates and oxides and insoluble silicates, aluminates and iron compounds, which comprises
(a) mixing said dust with water to form a slurry comprising undissolved solids and a solution of the soluble compounds in said dust, and
(b) passing said gas stream into said slurry whereby
said acidic oxides contained therein will react with water to produce acids,
the latter will react with said carbonates and oxides of alkali and alkaline earth metals to yield a solution of alkali and alkaline earth metal salts comprising principally the cationic components, calcium, potassium, magnesium and sodium, and anionic components, carbonate, sulfate and nitrate, and a precipitate of alkali and alkaline earth metal salts with insoluble silicates, aluminates and iron compounds, and
the gas of said gas stream after passing through said slurry emerges as scrubbed exhaust.

4,716,028

PROCESS FOR PREPARATION OF HIGH-TYPE SILICON NITRIDE POWDER

Kiyoshi Kasai, Atsugi; Takaaki Tsukidate, Hino, and Toshihiko Arakawa, Machida, all of Japan, assignors to Toyo Soda Manufacturing Co., Ltd., Shinnanyo, Japan

Filed Feb. 14, 1986, Ser. No. 829,171
Claims priority, application Japan, Feb. 18, 1985, 60-28467
Int. Cl.[4] C01B 21/063, 33/06
U.S. Cl. 423—344 5 Claims

1. A process of preparing crystalline silicon nitride by the thermal decomposition of a nitrogen-containing silane compound, said process comprising the steps of:

forming a powder or molded body having a powder bulk density of at least 0.1 g/cm^3 expressed in terms of silicon, from a mixture of a crystalline silicon nitride powder having an oxygen content of at least 1.0% by weight and a nitrogen-containing silane compound, and

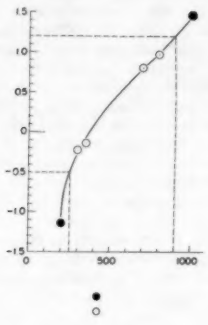
thermally decomposing said mixture while said mixture is heated at a temperature-elevating rate of at least 15° C. per minute in a temperature range of from 1,350° C. to 1,550° C., to obtain thereby an α-type silicon nitride powder.

4,716,029

BOEHMITE

Yasuo Oguri, Tokyo; Junji Saito, Yokohama, and Naoto Kijima, Tokyo, all of Japan, assignors to Mitsubishi Chemical Industries Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 641,722, Aug. 17, 1984, abandoned. This application Dec. 16, 1985, Ser. No. 809,049
Claims priority, application Japan, Feb. 23, 1982, 57-28008; Oct. 29, 1982, 57-190074; Aug. 23, 1983, 58-153466
The portion of the term of this patent subsequent to Dec. 16, 2003, has been disclaimed.
Int. Cl.[4] C01F 7/02
U.S. Cl. 423—625 1 Claim



1. A boehmite having an orthorhombic crystal form in which the ratio of the maximum length in the direction of the a-axis of the crystal to the distance between the opposing crystal faces perpendicular to the c-axis of said crystal is at least 10, said maximum length in the direction of the a-axis of the crystal is at least 2500 Å and said distance between the opposing faces perpendicular to the c-axis of said crystal is 250–900 Å.

4,716,030

METHOD FOR DETECTION OF EXOGENOUS OR ACTH STIMULATED GLUCOCORTICOIDS IN DOMESTIC ANIMALS

Dennis W. Macy, Ft. Collins, Colo., assignor to Colorado State University Research Foundation, Ft. Collins, Colo.

Filed Apr. 25, 1985, Ser. No. 727,288
Int. Cl.[4] A61K 49/00
U.S. Cl. 424—9 9 Claims

1. A method for detecting supraphysiological levels of glucocorticoids in an animal, comprising the steps of:

(a) administering a pharmacological dose of glucagon to an animal suspected of having supraphysiological glucocorticoid levels;

(b) taking a blood sample from the animal between about 15 and about 60 minutes after the glucagon administration; and

(c) comparing the blood glucose level of the sample with a blood glucose level of 300 mg/dl to indicate glucocorticoid use.

4,716,031

DRUG DISPENSER COMPRISING A MULTIPLICITY OF MEMBERS ACTING TOGETHER FOR SUCCESSFULLY DISPENSING DRUG

James B. Eckenhoff; Felix Theeuwes, both of Los Altos, and Joseph C. Deters, Mountain View, all of Calif., assignors to ALZA Corporation, Palo Alto, Calif.

Division of Ser. No. 591,824, Mar. 21, 1984, abandoned. This application Feb. 12, 1986, Ser. No. 828,810
Int. Cl.[4] A61K 9/48, 9/52
U.S. Cl. 424—453 3 Claims

1. A dispenser for delivering a beneficial drug at a controlled rate to a fluid biological environment of use having a temperature greater than 32° C., the dispenser comprising:

(a) a wall comprising a semipermeable polymeric composition that is permeable to the passage of a fluid present in the environment of use and substantially impermeable to the passage of a beneficial drug, the semipermeable wall surrounding in at least a part:

(i) an internal container, which container is a member selected from the group consisting of a one-piece capsule and a two-piece capsule comprising an internal compartment, said capsule member formed of a nontoxic composition adapted to be admitted into the biological environment of use comprising the gastrointestinal tract;

(ii) first means in the compartment for changing from a storable composition to a dispensable composition in response to the temperature of the biological environment, said first means a member selected from the group consisting of a glycerol ester of a fatty acid, polyethylene glycol, a block polymer of butylene oxide and ethylene oxide, a block polymer of propylene oxide and ethylene oxide, and a block polymer of polyoxyalkylene and propylene glycol;

(iii) a beneficial gastrointestinal administrable drug in the means responsive to temperature;

(iiii) a second means in the compartment for imbiding fluid through the semipermeable wall and for expanding in the compartment, said second means a member selected from the group consisting of a polysaccharide, and acidic carboxy polymer, a polyethylene oxide, and a starch composition, said second means in contacting arrangement with the first means; and,

(b) at least one passageway through the wall and through the container connecting the exterior of the dispenser with the first means for dispensing the beneficial drug from the dispenser.

4,716,032

AEROSOL SPRAY COMPOSITION FOR MASTITIS PREVENTION

Geoffrey J. Westfall, P.O. Box 285, Rte. 6, Brooklyn, Conn. 06234, and Franklin D. Haase, Ridge Farm, Ill., assignors to Geoffrey J. Westfall, Brooklyn, Conn.

Division of Ser. No. 519,909, Aug. 3, 1983, Pat. No. 4,548,807. This application Aug. 12, 1985, Ser. No. 764,751

Int. Cl.[4] A61K *9/12*

U.S. Cl. 424—45 15 Claims

1. A containerized product for use in preventing mastitis in dairy cattle and other animals, comprising: a container capable of being pressurized, said container having a valve means including an orifice nozzle discharge device capable of directing a disinfectant composition outwardly from said container; and a water based disinfectant composition contained within said container and being useful in the treatment of mastitis, said composition consisting essentially of a homogeneous mixture of: about 0.1 to 5.0 weight % of a disinfectant; about 5 to 75 weight % of a water and alcohol soluble aerosol propellant carrier having the characteristic of low temperature production upon volatilization; about 0 to 75 weight % of a lower alkanol; about 0 to 75 weight % of a water soluble emollient, either one or a combination of the alkanol and emollient being present in an amount of not less than 5 weight %; up to 1.0 weight % of a water soluble dye; and water in an amount sufficient to provide a total composition of 100 weight %; said mixture being uniformly homogeneous throughout the use thereof.

8. The product of claim 1, wherein said container is elongate and cylindrical and said valve means includes orifice nozzle means for directing an aerosol spray axially outwardly from one end of said container in a fan-shaped pattern.

4,716,033

MEDICAMENT ADSORBATES WITH SURFACTANT AND THEIR PREPARATION

John Denick, Jr., Newton, N.J., assignor to Warner-Lambert Company, Morris Plains, N.J.

Filed Mar. 27, 1986, Ser. No. 845,209

Int. Cl.[4] A61K *9/18, 9/16, 9/14*

U.S. Cl. 424—48 18 Claims

1. A medicament adsorbate which comprises:

a complex magnesium aluminum silicate having sorbed therein a solution of medicament drug and a surfactant.

4,716,034

PACKAGED DENTAL CREAM

Sandra L. Schelm, Highland Park, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Filed Nov. 27, 1985, Ser. No. 803,040

Int. Cl.[4] A61K *7/16*

U.S. Cl. 424—49 12 Claims

1. A packaged dental cream herein said dental cream is in direct contact with a low or medium density polyethylene or polypropylene surface, wherein syneresis occurs in said dental cream due to said direct contact when said dental cream comprises as ingredients an aqueous vehicle comprising a liquid vehicle comprising about 10–50% by weight of water and glycerine and sorbitol together in amount of about 15–50% by weight, the weight ratio of glycerine to sorbitol being from about 0.25:1 to about 3:1, a dental cream solid vehicle comprising about 0.05–10% by weight of a dental cream gelling agent and about 20–75% by weight of a dentally acceptable water-insoluble polishing material at least 50% by weight of which is alpha-alumina trihydrate, and a water-soluble inorganic phosphate compound in amount which reduces the pH of the dental cream to about 6-8; said dental cream comprising said ingredients and as an additive which prevents syneresis in said dental cream upon said direct contact about 0.5–2% by weight of polyethylene glycol of average moelecular weight of about 200–1000, the weight ratio of the total amount of glycerine and sorbitol to said polyethylene glycol being from about 60:1 to about 6:1.

4,716,035

ORAL COMPOSITIONS AND METHODS FOR TREATING GINGIVITIS

Padmini Sampathkumar, Fairfield, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Continuation-in-part of Ser. No. 738,103, May 24, 1985, Pat. No. 4,670,252, and a continuation-in-part of Ser. No. 811,148, Dec. 19, 1985, Division of Ser. No. 811,149, Dec. 19, 1985. This application Sep. 26, 1986, Ser. No. 912,728

Int. Cl.[4] A61K *7/16, 7/18, 9/68*

U.S. Cl. 424—52 20 Claims

1. A pharmaceutical composition suitable for treating or preventing dental plaque, or gingival, or periodontal diseases of the oral cavity with reduced staining of teeth or dentures, which composition comprises:

(a) from about 0.001% to about 99.9% of an organic monoperphthalic peroxy acid-based antigingivitis agent selected from 1,12-dodecanedioic peroxy acid and its derivatives, monoperphthalic acid and its derivatives, and the pharmaceutically-acceptable salts and esters thereof;

(b) from about 0.001% to about 10% of a source of F^- fluoride ions, which source essentially completely dissociates in aqueous solution to provide free F^- fluoride ions in solution; and

(c) a pharmaceutically-acceptable carrier suitable for delivering said antigingivitis agent and said fluoride ion source to the oral cavity.

4,716,036

STABILIZED DENTAL CREAM CONTAINING VEGETABLE OIL

Sandra L. Schelm, Highland Park, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Filed Jan. 22, 1986, Ser. No. 821,566

Int. Cl.[4] A61K *7/16, 7/26*

U.S. Cl. 424—57 9 Claims

1. A dental cream in direct contact with a low or medium density polyethylene or polypropylene surface, wherein syneresis occurs in said dental cream due to said direct contact when said dental cream comprises as ingredients a liquid vehicle comprising about 10–50% by weight of the dental cream of water, glycerine and sorbitol, the amount of glycerine and sorbitol together being about 15∝50% by weight of the dental cream, the weight ratio of glycerine to sorbitol being from about 0.25:1 about 3:1 about 0.05–10% by weight of the dental cream of gelling agent selected from the group consisting of Irish Moss, gum tragacanth, sodium carboxymethyl cellulose, hydroxyethyl cellulose, polyvinyl pyrrolidone, sodium alginate, guar gum, starch and xanthan, about 20–75% by weight of the dental cream of a dentally acceptable water-insoluble polishing material consisting essentially of at least 50% by weight of alpha-alumina trihydrate, and a water-soluble inorganic ortho-phosphate compound in amount which reduces the pH of the dental cream to about 6–8, and as an additive which prevents syneresis in said dental cream upon said direct contact, about 0.1–5% by weight of the dental cream of a vegetable oil being selected from the group consisting of coconut oil, palm oil, peanut oil and safflower oil.

4,716,037

METHOD OF ELIMINATING THE CORROSIVITY OF HAIR CONDITIONING COMPOSITIONS

Constance E. Erdman, and Timothy J. Padden, both of Racine County, Wis., assignors to S. C. Johnson & Son, Inc., Racine, Wis.

Filed Feb. 24, 1986, Ser. No. 832,565

Int. Cl.[4] A61K *7/06, 7/08*

U.S. Cl. 424—70 18 Claims

1. A method of eliminating the corrosion to stainless steel by

a corrosive hair conditioning composition which contains chloride ions or sulfate ions and is corrosive to stainless steel which comprises adding to the corrosive hair conditioning composition an effective corrosion inhibiting amount of a quaternary ammonium phosphate compound.

4,716,038

METHODS FOR THE ALLEVIATION OR TREATMENT OF ARTHRITIC DISEASE

John L. Stanford, Mill House, Claygate, Marden, Kent, England; Irun R. Cohen, 11, Hankin Street, Rehovot, Israel; Ayala Frenkel, 5, Hanasi Harishon Street, Rehovot, Israel; Joseph Holoshitz, 24, Hiber Street, Petach Tikva, Israel; Willem van Eden, Hooglandse Kerksteeg, 3, N-2312 HR Leiden, Netherlands, and Graham A. W. Rook, 27, Glenloch Road, London NW3 4DJ, England

PCT No. PCT/GB85/00183, § 371 Date Feb. 25, 2986, § 102(e) Date Feb. 25, 1986, PCT Pub. No. WO85/05034, PCT Pub. Date Nov. 21, 1985

PCT Filed Apr. 29, 1985, Ser. No. 817,742

Claims priority, application Israel, Apr. 27, 1984, 71683

Int. Cl.[4] A61K *39/02, 35/74*

U.S. Cl. 424—92 **6 Claims**

1. A method for the alleviation or treatment of arthritic disease which comprises administering to a patient suffering therefrom an effective amount of a composition comprising, as the active ingredient, a mycobacterium or a fraction thereof.

4,716,039

VIRUS INSECTICIDE COMPOSITIONS

Martin H. Rogoff, Potamac, Md., and Tsuong R. Shieh, Miami, Fla., assignors to Sandoz Pharm. Corp., E. Hanover, N.J.

Continuation of Ser. No. 638,014, Aug. 6, 1984, abandoned, which is a continuation of Ser. No. 139,845, Apr. 14, 1980, abandoned, which is a continuation of Ser. No. 4,276, Jan. 17, 1979, abandoned, which is a continuation-in-part of Ser. No. 751,725, Dec. 17, 1976, abandoned, which is a continuation-in-part of Ser. No. 596,986, Jul. 18, 1975, abandoned. This application May 16, 1985, Ser. No. 734,889

Int. Cl.[4] A01N *63/00*

U.S. Cl. 424—93 **40 Claims**

1. A particulate insecticidal composition comprising a free-flowing particle mass containing 0.1 to 35 percent by weight of a finely divided virus insecticide in which virions are in inclusion body form secured in from 65 to 99.9 percent by weight of a matrix comprising a material selected from the group consisting of a normally solid defatted vegetable proteinaceous material and mixtures of normally solid defatted vegetable proteinaceous material and clay in a weight ratio of 0.1 to 10 parts of said proteinaceous material per part of clay, such particles having a size in the range of from 3 to 150 microns, said virus insecticide being free of viruses which are not in inclusion body form.

4,716,040

CONTROLLED ABSORPTION METHYLDOPA PHARMACEUTICAL FORMULATION

Donald E. Panoz, Whale Bay, Bermuda, assignor to Elan Corporation P.L.C., Ireland

Filed Dec. 20, 1984, Ser. No. 685,324

Claims priority, application Ireland, Dec. 21, 1983, 3026/83

Int. Cl.[4] A61K *9/50, 9/58*

U.S. Cl. 424—459 **11 Claims**

1. A controlled absorption methyldopa formulation for oral administration, comprising a pellet having a core of methyldopa or a pharmaceutically acceptable salt thereof in association with an organic acid, and a multi-layer membrane surrounding said core and containing a major proportion of a pharmaceutically acceptable film forming, water-insoluble polymer and a minor proportion of a pharmaceutically acceptable film forming, water-soluble polymer, the number of layers in said membrane and the ratio of said water-soluble polymer to said water-insoluble polymer being effective to permit release of said methyldopa from said pellet at a rate allowing controlled absorption thereof over a twenty four hour period following oral administration said rate being measured in vitro as a dissolution rate which is substantially pH independent and which when measured in a Basket Assembly according to U.S. Pharmacopoeia XX at 37° C. and 75 r.p.m., substantially corresponds to the following dissolution pattern:

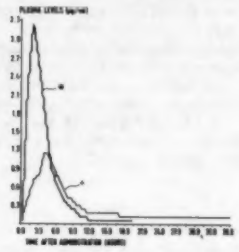


FIG.1

(a) from 25 to 50% of the total methyldopa is released after 1 hour of measurement in said assembly;
(b) from 50 to 80% of the total methyldopa is released after 3 hours of measurement in said assembly;
(c) from 80 to 100% of the total methyldopa is released after 5 hours of measurement in said assembly; and
(d) from 90 to 100% of the total methyldopa is released after 7 hours of measurement in said assembly.

4,716,041

DIFFUSION COATED MULTIPLE-UNITS DOSAGE FORM

Kim Kjørnaes, Valby; Finn N. Christensen, Hørsholm, and Jens R. Jensen, Stenløse, all of Denmark, assignors to A/S Alfred Benzon, Copenhagen, Denmark

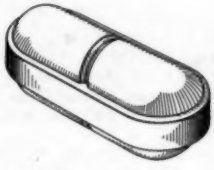
PCT No. PCT/DK85/00005, § 371 Date Oct. 28, 1985, § 102(e) Date Oct. 28, 1985, PCT Pub. No. WO85/03436, PCT Pub. Date Aug. 15, 1985

PCT Filed Feb. 8, 1985, Ser. No. 795,497

Claims priority, application Denmark, Feb. 10, 1984, 620/84; Feb. 10, 1984, 621/84

Int. Cl.[4] A61K *9/14, 9/22*

U.S. Cl. 424—468 **25 Claims**



1. An oral pharmaceutical controlled release multiple-units formulation in which individual units containing an active substance are coated with a substantially water-insoluble, but water-diffusible controlled release coating comprising

(1) an inner film layer which causes adhesion between the units at elevated temperatures comprising a water-dispersible film-forming agent, and

(2) an outer film layer comprising a water-based film-forming agent which prevents adhesion between the units at elevated temperatures and imparts flowability to the units, the coated units having been subjected to heating at a temperature at which the formation of a continuous phase of the film-forming agent of the inner film layer is accelerated to form a coating which does not substantially change its diffusion characteristics in the course of time.

4,716,042

STABILIZED COATED ASPIRIN TABLETS

Robert G. Blank, Vineland, N.J., and Ronald W. Miller, Huntingdon Valley, Pa., assignors to American Home Products Corporation, New York, N.Y.

Filed Jun. 16, 1986, Ser. No. 874,956
Int. Cl.[4] A61K *9/28*
U.S. Cl. 424—474 4 Claims

1. A film coated aspirin tablet/caplet containing as the active ingredient a material selected from the group consisting of aspirin and aspirin with caffeine wherein acetylsalicylic acid decomposition is inhibited by incorporation therein prior to coating of a small decomposition inhibiting amount of an acid selected from the group consisting of citric acid, alginic acid, glutamic acid and admixtures thereof, the coated tablet/caplet having been film or enteric coated from an aqueous solution of a film or enteric coating material.

4,716,043

PROCESS FOR MAKING PORTIONED CHEESE

Jens Peter S. Hansen, Risskov, Denmark, assignor to Jens Peter Hansen, Aarhus A/S, Denmark

PCT No. PCT/DK84/00071, § 371 Date Mar. 20, 1985, § 102(e) Date Mar. 20, 1985, PCT Pub. No. WO85/00501, PCT Pub. Date Feb. 14, 1985
PCT Filed Jul. 26, 1984, Ser. No. 718,021
Claims priority, application Denmark, Jul. 28, 1983, 3460/83
Int. Cl.[4] A23C *9/137, 19/02*
U.S. Cl. 426—35 4 Claims

1. A process for producing portioned cheese, consisting essentially of:

mixing a milk concentrate having a solids content of 35–40% and a temperature of between 0° to 60° C. with glucono-delta-lactone and additives selected from the group consisting of rennet, lipase, organic acids, calcium chloride, stabilizers, emulsifiers, phosphates, citrates and salts, thereby forming a liquid mixture to be coagulated, said milk concentrate obtained by ultrafiltration or diafiltration of whole milk or skim milk;

dispensing said liquid mixture, before coagulation takes place, into individual packages; and

closing hermetically and storing said individual packages to permit coagulation and ripening of said liquid mixture without any contamination;

wherein the amount of glucono-delta-lactone and said temperature are selected to ensure that coagulation of said liquid mixture occurs after said liquid mixture has been dispensed into said individual containers.

4,716,044

PROCESS FOR OBTAINING JUICES FROM FRUITS CONTAINING SAME

Ronald L. Thomas, Clemson; Terry C. Titus, Seneca, and Craig A. Brandon, Clemson, all of S.C., assignors to Clemson University, Clemson, S.C.

Filed Jan. 31, 1986, Ser. No. 825,083
Int. Cl.[4] A23L *2/06;* B01D *13/00*
U.S. Cl. 426—51 18 Claims

1. An improved process for obtaining friut juice from fruit containing same consisting essentially of the steps of:

(a) processing friut from which said juice is to be obtained to produce a pumpable fluid puree of fruit and juice;

(b) providing an elongated tubular rigid porous housing of predetermined size and length, said housing having a food grade ultrafiltration membrane secured along inside surfaces of same, said membrane having an initial permeability (P) to water of from about 1 to about 15 as determined by the formula

$$P = \frac{\text{permeate flux}}{\text{pressure}}$$

where permeate flux is the number of gallons of water passing through a square foot of membrane per day and pressure is measured in pounds per square inch;

(c) simultaneously extracting said juice from said puree and clarifying and sterilizing said juice by pumping said puree in a single pass through said tubular housing at an inlet pressure of from about 100 to about 1000 pounds per square inch during which said puree makes tangential contact with said membrane and said juice passes through said membrane and is extracted, clarified and sterilized thereby.

4,716,045

PROCESS FOR THE MANUFACTURE OF A DAIRY PRODUCT

Giovanni Prella, Vercelli, Italy, assignor to Nestec S.A., Vevey, Switzerland

Filed Dec. 11, 1985, Ser. No. 807,550
Claims priority, application European Pat. Off., Dec. 24, 1984, 84116296.9
Int. Cl.[4] A23C *19/00*
U.S. Cl. 426—63 17 Claims

1. A method for manufacturing a non-fermented dairy product of the soft-curd fresh cheese type comprising preparing a starting mixture by homogeneously mixing casein in the native state, fats and whey proteins, sterilizing the starting mixture at a pH and at a temperature and for a time which maintains the casein in the native state and reactive to rennet, introducing the sterilized starting mixture and sterile rennet into a sterile container under hygienic conditions and hermetically sealing the sterilized mixture and sterile rennet product within the container and then subjecting the hermetically sealed product to temperature and time conditions sufficient for the sterile rennet to set the product.

4,716,046

PULVERULENT WATER-SOLUBLE NONHYGROSCOPIC COMPOSITION FOR PREPARING BEVERAGES WITH A LASTING EFFERVESCENCE AND METHOD FOR PREPARING THE SAME

Louis F. Lavie, Lausanne, Switzerland, assignor to Dridrinks N.V., Curacao, Netherlands Antilles

Continuation-in-part of Ser. No. 599,695, Apr. 12, 1984, Pat. No. 4,579,742. This application Jan. 7, 1985, Ser. No. 689,440
Claims priority, application European Pat. Off., Dec. 19, 1984, 84810641.5
The portion of the term of this patent subsequent to Apr. 1, 2003, has been disclaimed.
Int. Cl.[4] A23L *2/40;* A61K *9/36, 9/62*
U.S. Cl. 426—96 18 Claims

1. A pulverulent effervescent, water-soluble, non-hygroscopic composition for use as the basis for diet or soft drinks, said composition comprising a mixture of components in particulate form capable of reacting mutually in the presence of water to evolve gas, characterized in that each of the particulate components is impregnated with the dry residue of a heat-treated saccharose or saccharose derivative ethanolic liquor containing gum arabic.

4,716,047

FAT BLENDS CONTAINING MILK FAT OR A MILK FAT FRACTION AND NON-MILK FAT, AND SPREADS CONTAINING SAID FAT BLENDS

Gerhard Biernoth, Quickborn; Hans-Udo Mesz, Schenefeld; Klaus H. Todt, and Theophil Wieske, both of Hamburg, all of Fed. Rep. of Germany, assignors to Lever Brothers Company, New York, N.Y.

Filed Jan. 21, 1986, Ser. No. 821,105

Claims priority, application United Kingdom, Jan. 24, 1985, 8501778

Int. Cl.[4] A23D *3/00*

U.S. Cl. 426—603 22 Claims

1. A fat blend comprising 10–90 wt. % of milk fat or a milk fat portion and 90–10 wt. % of a non-milk fat wherein

(i) the non-milk fat comprises 15–50 wt. % glycerides selected from the group consisting of S_2X, SYZ, SZY, SYY, SZZ glycerides and mixtures thereof;

(ii) the total amount of SYZ, SZY, SY_2 and SZ_2 glycerides is at least 12 wt. % when the amount of S_2X glycerides is less than 7 wt. %, based on the non-milk fat;

(iii) the total amount of SYZ, SZY, SY_2 and SZ_2 glycerides is at least 3 wt. % when the amount of S_2X glycerides is at least 7 wt. %, based on the non-milk fat, and 50–85% wt. % of triglycerides having a composition such that the fat solids profile of the non-milk fat corresponds to the following percentages of crystallized fat measured by NMR: $N_{10° C.}$=15–65; $N_{20° C.}$=10–30; $N_{35° C.}$=0–3

S being a saturated fatty acid residue containing 16 or more carbon atoms,

X is a saturated fatty acid residue containing 2–8 carbon atoms, a cis-unsaturated fatty acid containing 16 or more carbon atoms, or a hydroxy group,

Y is a trans-unsaturated fatty acid residue containing 16 or more carbon atoms,

Z is a saturated fatty acid residue containing 12 or 14 carbon atoms.

4,716,048

PROCESS FOR FORMING DEPOSITED FILM

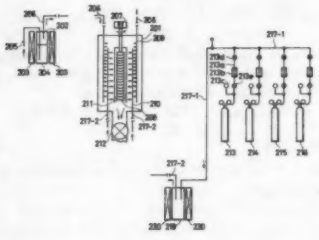
Shunichi Ishihara, Ebina; Shigeru Ohno, Yokohama; Masahiro Kanai; Shunri Oda, both of Tokyo, and Isamu Shimizu, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 11, 1986, Ser. No. 828,256

Claims priority, application Japan, Feb. 12, 1985, 60-025896; Feb. 18, 1985, 60-029809; Feb. 19, 1985, 60-031053; Feb. 20, 1985, 60-031871; Feb. 21, 1985, 60-033276; Feb. 22, 1985, 60-034778

Int. Cl.[4] H01L *21/469*

U.S. Cl. 427—39 21 Claims



1. A process for forming a deposited film, which comprises introducing into a film forming space housing a substrate therein an active species (A) formed by decomposition of a compound containing germanium and a halogen and an active species (B) formed by decomposition of a chemical substance for film formation which is reactive with said active species (A) separately from each other, and then allowing both the species to react with each other thereby to form a deposited film on the substrate.

4,716,049

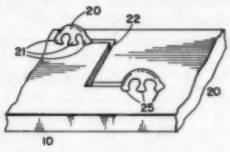
COMPRESSIVE PEDESTAL FOR MICROMINIATURE CONNECTIONS

Nils E. Patraw, Redondo Beach, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Division of Ser. No. 811,560, Dec. 20, 1985. This application Jun. 30, 1986, Ser. No. 880,478

Int. Cl.[4] B05D *5/12*

U.S. Cl. 427—96 2 Claims



1. A method for making a resilient microelectronic connective member including the steps of:

providing a substrate for forming said resilient microelectronic connective member;

covering said substrate with a substrate mask having an aperture;

filling said aperture with a filling material which will form a positive meniscus at the top boundary of said substrate mask in order to form a rounded pillar on said substrate within said aperature;

dissolving said substrate mask with a dissolving substance that will remove said substrate mask from said substrate but that will leave said pillar intact on said substrate;

impressing a pedestal design mask over said pillar;

depositing a layer of metal over said pedestal design mask in order to form a resilient microelectronic connective member; and

dissolving said pillar with a dissolving substance that will remove said pillar but that will leave said resilient microelectronic connective member on said substrate.

4,716,050

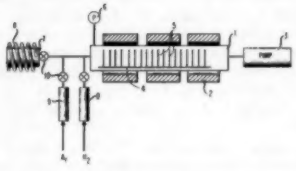
CHEMICAL VAPOR DEPOSITION OF ALUMINUM ON AN ACTIVATED SURFACE

Martin L. Green, New Providence; Roland A. Levy, Berkeley Heights, and Ralph G. Nuzzo, Summit, all of N.J., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Continuation of Ser. No. 861,119, May 7, 1986, abandoned, which is a continuation of Ser. No. 730,674, May 3, 1985, abandoned. This application Nov. 10, 1986, Ser. No. 928,744

Int. Cl.[4] B05D *5/12*; C23C *16/20*

U.S. Cl. 427—99 9 Claims



1. In the manufacture of semiconductor integrated devices, a method for depositing an aluminum layer on a surface,

said depositing being by chemical vapor deposition while said substrate is heated at a desired temperature, and

said method comprising treating said surface, prior to said depositing, with an activating agent so as to produce on said surface a surface layer comprising hydroxyl groups, derivatizing said surface layer, and decomposing the derivatized layer.

4,716,051

IMPREGNATION OF CONCRETE IN DEPTH

Karl-Martin Rödder, Troisdorf-Spich, Fed. Rep. of Germany, assignor to Dynamit Nobel AG, Troisdorf Bez Koeln, Fed. Rep. of Germany

Continuation of Ser. No. 689,034, Jan. 7, 1985, abandoned, which is a continuation of Ser. No. 514,186, Jul. 15, 1983, abandoned. This application Nov. 26, 1985, Ser. No. 801,792

Claims priority, application Fed. Rep. of Germany, Jul. 31, 1982, 3228660

Int. Cl.[4] B05C *1/16*; B05D *5/10*

U.S. Cl. 427—136 **7 Claims**

1. A method for hydrophobizing depth-impregnation of a set heavy concrete comprising treating at least one surface of the set heavy concrete with a solvent free alkyl trialkoxysilane wherein the alkyl group has 3 to 8 carbon atoms and the alkoxy group has 1 or 2 carbon atoms.

4,716,052

METHOD OF MAKING PRESSURE SENSITIVE ADHESIVE TAG OR LABEL STOCK

Robert E. Waugh, Sun City Center, Fla.; Urban R. Nannig, North Kingstown, R.I., and Clyde R. Rockwood, Columbus, Ohio, assignors to The D. L. Auld Company, Columbus, Ohio

Filed Jan. 21, 1986, Ser. No. 820,270

Int. Cl.[4] B41M *3/12*

U.S. Cl. 427—147 **7 Claims**

1. A method of making stock for a tag, label, or the like comprising the steps of:

(a) providing a layer of pressure sensitive adhesive,

(b) treating a first surface of said pressure sensitive adhesive by the application of a inert particulate material to render said first surface substantially tack free and suitable for printing directly thereon, and

(c) printing indicia directly on said substantially tack free first surface of said pressure sensitive adhesive.

4,716,053

TUBING COATING DEVICE AND METHOD

Luther Eskijian, 2223 Midlothian Dr., Altadena, Calif. 91001

Filed Feb. 26, 1986, Ser. No. 833,341

Int. Cl.[4] B05D *7/22*

U.S. Cl. 427—230 **20 Claims**

1. The method of applying a coating of viscous material to bores of an outer tube and of an insert tube, and proximate the inserted end of the insert tube, the steps including:

(a) inserting a sealing element forwardly within the bore of the outer tube and to a position proximate said inserted end of the insert tube, and also locating a plunger within said insert tube, with said viscous material on the surface of the plunger, and the sealing element carried on the plunger,

(b) advancing a pusher forwardly on the plunger to push said viscous material toward and proximate said sealing element and proximate said end of the insert tube,

(c) distorting said sealing element to engage the bore of the outer tube, and also squeezing said viscous material against the bores of the tubes proximate said end of the insert tubing,

(d) and causing said element to more away from the bore of the outer tube and withdrawing the element and pusher rearwardly from the tubes.

12. In apparatus for applying coating of viscous material to bores of an outer tube and of an insert tube, and proximate the inserted end of the insert tube, the combination including:

(a) plunger means and a distortable sealing element carried thereon to be inserted forwardly within the bore of the outer tube and to carry said element to a position proximate said inserted end of the insert tube, whereby viscous material may be located on the surface of the plunger,

(b) a pusher carried to be advanced forwardly on the plunger to push said viscous material toward and proximate said element and proximate said end of the insert tube,

(c) means for distorting said element to engage the bore of the outer tube, enabling confinement of said viscous material against the bores of the tubes proximate said end of the insert tubing, and for allowing contracting of said element away from the bore of the outer tube and withdrawal the contracted element and pusher rearwardly from the tubes.

4,716,054

ACCELERATED FIXING OF CHROMATE-CONTAINING WOOD PRESERVATIVE SALTS

Richard Stanek, Mainz-Finthen; Hans-Norbert Marx, Buehl-Weitenung; Wendelin Hettler, Sinzheim-Muellhofen, and Claus Wagner, Neumarkt, all of Fed. Rep. of Germany, assignors to Basf Aktiengesellschaft, Fed. Rep. of Germany

Filed Mar. 12, 1986, Ser. No. 838,782

Claims priority, application Fed. Rep. of Germany, Mar. 22, 1985, 3510364

Int. Cl.[4] B05D *3/12*

U.S. Cl. 427—297 **3 Claims**

1. A process for the accelerated fixing of chromate-containing wood preservative salts, in which freshly impregnated timbers are subjected to fixing with superheated steam, wherein the freshly impregnated timbers are subjected first to a dry heat treatment in which both the wood surface and the internal walls of the heating chamber are heated to 60°–100° C. and the timbers are then treated with superheated steam in a conventional manner.

4,716,055

CONDUCTIVE FIBER AND METHOD OF MAKING SAME

John H. Sanders, Newport News, Va.; Louis D. Hoblit, Lake Jackson, Tex., and Joe A. Mann, Greensboro, N.C., assignors to BASF Corporation, Williamsburg, Va.

Filed Aug. 5, 1985, Ser. No. 762,360

Int. Cl.[4] C23C *18/30*

U.S. Cl. 427—304 **15 Claims**

1. A process of making an electrically conductive polymeric filament comprising:

(a) mixing a catalyst with a polymer wherein said polymer is catalyzed for electroless deposition of a metal;

(b) extruding the mixture of step (a) to form a catalyzed filamentary polymeric material; and

(c) electrolessly depositing a metal coincident with said catalyzed filamentary polymeric material to form said conductive polymeric filament; wherein said conductive polymeric filament has a metallic zone occupying at least 1% of the cross-sectional area of said conductive polymeric filament.

4,716,056

SYSTEM FOR TREATING A SURFACE

Frank Fox, 52A Robins Ave., Newington, Conn. 06111, and Cassius W. Leys, 80 E. Hartsdale Ave., Hartsdale, N.Y. 10530

Filed Dec. 24, 1986, Ser. No. 945,887
Int. Cl.[4] B05D 3/02
U.S. Cl. 427—407.1 18 Claims

1. A method for treating a surface to facilitate subsequent removal of any markings placed thereon, said method comprising the steps of:

preparing by scraping, degreasing, brushing, sanding and/or washing said surface;

applying a water-based epoxy to said surface and permitting said water-based epoxy to dry for a period sufficient to allow the release of any moisture contained therein; and

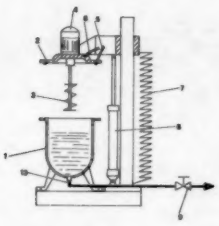
applying a top coat which includes an aliphatic urethane color component to said surface and permitting said top coat to dry thereon.

4,716,057

PROCESS FOR THE PREPARATION OF PUTTY FOR USE IN COATING, INCLUDING AUTOMATIC COATING OF SLABS OF MARBLE OR STONE AND THE LIKE UNDER VACUO IN TWO SEPARATE CONTAINERS

Marcello Toncelli, Via Giovanni XXIII,, 2 Bassano Del Grappa, Vicenza, Italy

Filed Sep. 25, 1986, Ser. No. 911,484
Claims priority, application Italy, Sep. 30, 1985, 85601 A/85
Int. Cl.[4] B05D 3/02
U.S. Cl. 427—393.6 1 Claim



1. A method of coating a slab of marble, stone which consists of mixing in a first container the ingredients of the first component of a putty, said first component comprising polyester resins, calcium carbonate, silica gel and a catalyst, evacuating the container and mixing said ingredients under vacuo to obtain an homogeneous mixture, introducing into a second container the ingredients of the second component of the putty which contains the accelerator, said ingredients comprising a polyester resin, calcium carbonate and silica gel, evacuating the second container and mixing said ingredients therein under vacuum, introducing compressed air into the containers, removing only the desired quantities of each of said components at the time of use and causing said desired quantities to be spread directly onto the slab being coated whereby the premature hardening of the putty and the incorporation of air are avoided.

4,716,058

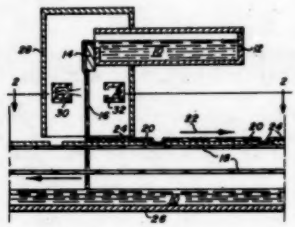
METHOD OF CURTAIN COATING TO MAKE THIN DIELECTRIC CERAMIC LAYERS

Thomas M. Morin, Adams, Mass., assignor to Sprague Electric Company, North Adams, Mass.

Filed Aug. 25, 1986, Ser. No. 899,832
Int. Cl.[4] B05D 1/30
U.S. Cl. 427—420 9 Claims

1. A method for making a ceramic capacitor having at least one buried electrode including depositing at least one foundation ceramic-paint coating on a substrate, depositing one patterned electroding ink film on said foundation coating, depositing a dielectric-ceramic-paint coating over said film and depositing another patterned electroding ink film on said dielectric-ceramic-paint coating, wherein the improvement comprises:

continuously pumping a dielectric-ceramic paint into a reservoir of the kind that discharges said paint as a falling paint curtain; directing a source of electromagnetic radiation through said curtain equally near the left edge and near the right edge of said curtain; sensing the radiation transmitted through said curtain;



passing said substrate through said falling paint curtain to accomplish said depositing of said dielectric-ceramic-paint; and

adjusting the symmetry of paint discharge from said reservoir to cause the radiation through said curtain near said left edge of said curtain to equal the transmitted radiation near said right edge so that the falling curtain is equally thick near both said edges and said dielectric-ceramic-paint coating is rendered uniformly thick between opposite edges on said substrate.

4,716,059

COMPOSITES OF METAL WITH CARBON FLUORIDE AND METHOD OF PREPARATION

Jung T. Kim, Williamsville, N.Y., assignor to Allied Corporation, Morris Township, Morris County, N.J.

Filed Feb. 26, 1987, Ser. No. 18,892
Int. Cl.[4] B05D 1/18
U.S. Cl. 427—443.1 14 Claims

1. A process for the simultaneous electroless deposition of particulate carbon fluoride and metals comprising:

(a) suspending up to 20 wt. % carbon fluoride particles having an average particle size of 0.2 to 8 μm in an aqueous solution comprising,

(1) about 0.5 to 2.0 % by volume of a non-ionic surfactant having an HLB number of 10 to 20, and optionally

(2) up to about 20% by volume of a cationic surfactant relative to said non-ionic surfactant of (a) (1),

(b) adding the suspension of carbon fluoride particles of (a) to an electroless metal plating bath;

(c) suspending a solid in the electroless metal plating bath containing suspended carbon fluoride particles for a period of time sufficient to co-deposit the desired amount of carbon fluoride and metal.

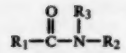
4,716,060

WATER PROOFING AND PRESERVATIVE METHODS

Vithal J. Rajadhyaksha, and Nelly M. Rajadhyaksha, both at 27436 Esquina, Mission Viejo, Calif. 92691

Filed May 2, 1986, Ser. No. 859,059
Int. Cl.[4] A01N 3/00; B27K 3/00; B32B 9/04
U.S. Cl. 428—15 25 Claims

1. The method of treating the surface of wood, concrete, stone, leather, rubber, paint, or metal, comprising coating the surface with a solvent comprising from about ten percent to one hundred percent of the total solvent a compound having the formula:



wherein R_1, R_2 and R_3 are saturated alkyls having from 2 to 20 carbon atoms, and wherein at least one of R_1, R_2 and R_3 is a saturated alkyl having at least 12 carbon atoms and wherein either R_1 and R_2, R_1 and R_3, or R_2 and R_3 is in the form of a cyclic structure, thus forming a nitrogen heterocyclic compound.

4,716,061

POLYPROPYLENE/POLYESTER NONORIENTED HEAT SEALABLE MOISTURE BARRIER FILM AND BAG

John P. Winter, Appleton, Wis., assignor to Presto Products, Incorporated, Appleton, Wis.

Filed Dec. 17, 1985, Ser. No. 810,110
Int. Cl.[4] B65B *25/06*; B32B *27/08*
U.S. Cl. 428—35 **40 Claims**

1. A nonoriented, heat sealable, coextruded, moisture barrier film comprising:

a base layer selected from the group consisting of a polypropylene homopolymer, a polypropylene copolymer and combinations thereof;

a heat sealant layer selected from the group consisting of a polyester, a copolyester and combinations thereof; and

a tie layer between the base layer and the heat sealant layer selected from the group consisting of a modified polyolefin blend, an unmodified polyethylene copolymer and combinations thereof.

4,716,062

COMPOSITE MATERIALS, THEIR PREPARATION AND ARTICLES MADE THEREFROM

Max Klein, P.O. Box 3, Dalton, Mass. 01226

Filed Nov. 8, 1985, Ser. No. 796,929
Int. Cl.[4] C08J *5/02*; B32B *5/06*
U.S. Cl. 428—36 **26 Claims**

1. An aqueous dispersion for the production of composite material in the form of a sheet or web comprising a continuous matrix phase which surrounds a reinforcement phase composed of discrete reinforcing elements, the disperse phase of said aqueous dispersion including (i) polymer micro-bits produced from an expanded, hydrophobic, thermoplastic polymer which is non-brittle in expanded form, said polymer micro-bits being substantially completely free of intact cells of the expanded polymer from which they are produced, (ii) at least one finely divided, hydrophobic, heat fusible resin, and (iii) said reinforcing elements.

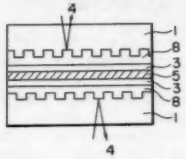
4,716,063

INFORMATION RECORDING DISK

Haruo Uehara, Yokohama, and Hiroshi Omata, Kawasaki, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 21, 1985, Ser. No. 789,837
Claims priority, application Japan, Oct. 23, 1984, 59-223714
Int. Cl.[4] C08G *75/04*; G11B *7/24*
U.S. Cl. 428—65 **6 Claims**

1. An information recording disk prepared by a method wherein a liquid precursor is held between an information recording disk mold and a transparent support substrate and is cured to form a resin transfer layer integrally with the transparent support substrate, and the information pattern on the mold is transferred to the resin transfer layer, characterized in that the resin precursor used in the resin transfer layer comprises a major components a cycloacetal compound having at least two polymerizable unsaturated groups, a compound having at least two mercapto groups, and an acrylic ester and/or methacrylic ester.



4,716,064

COMPOSITE STIFF LIGHTWEIGHT STRUCTURE AND METHOD FOR MAKING SAME

Robert A. Holzl, LaCanada, and Robert E. Benander, Sylmar, both of Calif., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Oct. 31, 1985, Ser. No. 793,828
Int. Cl.[4] B32B *3/12*
U.S. Cl. 428—73 **5 Claims**

1. A lightweight structure having a high stiffness to weight ratio comprising, at least a pair of outer surface defining elements extending spaced from each other to define a volume therebetween and comprising substantially planar and substantially parallel members, and at least one stiffening element extending between said outer surface defining elements within the volume defined thereby, said stiffening element defining a volume and being substantially cylindrical and the axis of which intersects said parallel members at substantially a right angle and having at least one wall intersecting each of said outer surface defining elements, said stiffening element and said outer surface defining elements comprising a chemically vapor deposited material selected from the group consisting of the carbides, nitrides, and borides of silicon and titanium, and carbides and nitrides of boron as a monolithic structure having a thickness of at least about 1 millimeter.

4,716,065

UNDERLYING PAD FOR ATTACHING REMOVABLE AUTOMOBILE CARPET

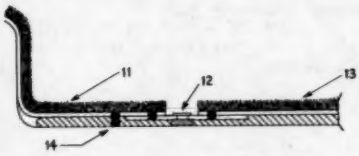
John J. McLaughlin, 729 Shore Rd., Somers Point, N.J. 08244

Continuation-in-part of Ser. No. 752,806, Jul. 6, 1985, abandoned, which is a continuation-in-part of Ser. No. 649,909, Sep. 4, 1984, Pat. No. 4,671,981. This application Nov. 10, 1986, Ser. No. 929,261
Int. Cl.[4] B32B *3/06*
U.S. Cl. 428—95 **10 Claims**

3. A means to construct removable automobile carpets positioned in the openings cut out of the main floor carpet in the well areas of an automobile, with such removable carpets being in the same plane as the main automobile floor carpet, comprising in combination:

a. Underlying pads that rest on the car floor,

b. a main automobile floor carpet with the well areas having corresponding openings.



c. removable carpets that insert into the openings in the main automobile floor carpet, rest on the top of the underlying pad or pads and having one side of a border fastener adhered to the pad (or pads).

4,716,066

FILLING BODY OF ACID-RESISTANT SYNTHETIC PLASTICS MATERIAL

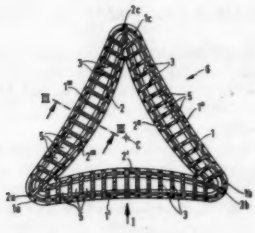
Paul Wymann, Basel, and Volker Fattinger, Arlesheim, both of Switzerland, assignors to Wam-Plast AG, Basel, Switzerland

Filed Apr. 4, 1986, Ser. No. 848,052

Claims priority, application Switzerland, Apr. 16, 1985, 1608/85

Int. Cl.⁴ B32B *3/12*

U.S. Cl. 428—116 **30 Claims**



1. A triangular filling body including three wall sections having inner and outer walls of acid-resistant synthetic plastic material, a plurality of which bodies, heaped-up in an irregular manner, have, per cubic meter of bulk volume, a total source area of more than 250 m^2, said filling body having a central axis, and more than 80% of the surface of said filling body being present on walls, the thickness of which corresponds to the thickness of sheets of the synthetic plastic material from which they are made, said outer walls defining an outside of said body, said inner and outer walls being concavely curved relative to said outside of said body, said outer walls forming an enclosure and being destined to be subject to pressure from superimposed filling bodies in a heaped-up bulk, said three wall sections being constituted by a row of cells having parallel walls and are open to the passage of gas therethrough along the axes of said cells, the number of cells in each of said wall sections being greater than three.

4,716,067

HONEYCOMB CORE STRUCTURE WITH EMBEDDED FASTENER

Yukimori Moji, Seattle, and Richard Q. Taylor, Tukwila, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Sep. 12, 1986, Ser. No. 906,209

Int. Cl.⁴ B32B *3/12*

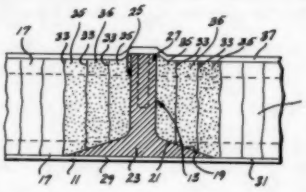
U.S. Cl. 428—117 **42 Claims**

22. A synthetic skin/honeycomb core sandwich structure with an embedded fastener comprising:

a honeycomb core layer;

at least one fastener embedded in said honeycomb core layer, said at least one fastener having a shank and an enlarged head witha flat exterior surface, said fastener embedded in said honeycomb core layer such that the flat exterior surface of said head lies co-planar with one surface of said honeycomb core and the shank of said fastener lie transverse to the plane of said honeycomb core layer;

potting material located in the cells of said honeycomb core layer that surrounds said at least one fastener;



a first nonmetallic synthetic layer bonded to both the surface of said honeycomb core layer that is coplanar with the flat exterior surface of the head of said at least one fastener and the flat exterior surface of the head of said at least one fastener; and,

a second nonmetallic synthetic layer bonded to the surface of said honeycomb core layer remote from the surface to which said first nonmetallic synthetic layer is bonded.

4,716,068

POLYPROPYLENE ADHESIVE TAPE

Walter Seifried, Weisbaden, and Guenther Crass, Taunusstein, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Jan. 17, 1986, Ser. No. 819,631

Claims priority, application Fed. Rep. of Germany, Jan. 19, 1985, 3501726

Int. Cl.⁴ B32B *3/00*; C09J *7/02*

U.S. Cl. 428—141 **18 Claims**

1. An adhesive tape, comprising:

a co-extruded polypropylene base film having molecular chains oriented by three-stage biaxial stretching, consisting essentially of:

a base layer comprising polypropylene,

a first covering layer comprising polypropylene and a diorganopolysiloxane as a modifier, and

a corona-treated, second covering layer comprising polypropylene and a natural or synthetic resin modifier having a softening point of from about 70° to about 170° C. wherein said second covering layeer is corona-treated on its surface facing away from said base layer; and

an adhesive layer applied directly to the corona-treated surface of said second covering layer.

4,716,069

PROCESS FOR PRODUCING A PLASTIC LAMINATE OF LOW DENSITY POLYMERIC MATERIAL AND HIGH DENSITY POLYMERIC MATERIAL AND LAMINATE MADE THEREOF

Paul Burke, 45 Springhill Park, Killiney, Co. Dublin, Ireland

Filed Dec. 16, 1985, Ser. No. 809,475

Claims priority, application Ireland, Dec. 17, 1984, 3229/84

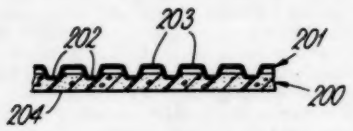
Int. Cl.⁴ B32B *3/28*

U.S. Cl. 428—167 **15 Claims**

12. A plastic laminate comprising

a first lamina of foamed low density polymeric material;

a second corrugated lamina of non-foamed high density polymeric material bonded directly to said first lamina;



said first lamina having a thickness at least fifty times greater than the thickness of said second laminae.

4,716,070

SEALANT COMPOSITIONS AND SEALED DOUBLE GLAZING UNITS

Edward W. Duck, Guangelloch, and Ingolf Scheffler, Wiesloch, both of Fed. Rep. of Germany, assignors to Teroson G.m.b.H., Fed. Rep. of Germany

Filed Mar. 28, 1986, Ser. No. 845,281

Claims priority, application United Kingdom, Mar. 28, 1985, 8508114

Int. Cl.[4] C08G *18/62*

U.S. Cl. 428—192 8 Claims

1. A double glazing unit comprising two spaced apart glass panes sealed together around their edges by a seal obtained by reacting (a) an isocyanate component and (b) a reactive component comprising a polymer having terminal functional groups that can react with the isocyanate component to form a polyurethane, wherein the polymer having functional groups is an isoprene polymer.

4,716,071

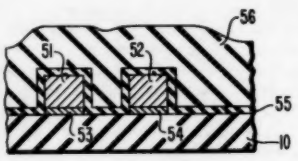
METHOD OF ENSURING ADHESION OF CHEMICALLY VAPOR DEPOSITED OXIDE TO GOLD INTEGRATED CIRCUIT INTERCONNECT LINES

Bruce E. Roberts; Jimmy C. Black, both of Palm Bay, and Dyer A. Matlock, Melbourne, all of Fla., assignors to Harris Corporation, Melbourne, Fla.

Filed Aug. 22, 1985, Ser. No. 768,326

Int. Cl.[4] B32B *9/00, 27/06*

U.S. Cl. 428—209 9 Claims



1. A gold interconnect/oxide of silicon insulator structure for providing relatively insulated conductor paths overlying an integrated circuit-containing semiconductor body comprising:

a plurality of gold interconnected lines distributed over said semiconductor body;

a thin gold-to-oxide of silicon adhesion film formed on each of said gold interconnect lines, said film containing a first gold-titanium region contiguous with the gold of said gold interconnect lines and a second region of an oxide of titanius contiguous with said gold-titanium region; and

a layer of an oxide of silicon formed on said thin gold-to-oxide of silicon adhesion film so as to be contiguous with second contiguous with the second region of an oxide of titanium thereof.

4,716,072

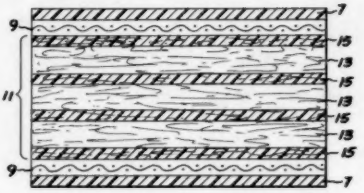
MULTILAYER COMPOSITE STRUCTURE FOR SMOOTH SURFACES

Bang M. Kim, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Dec. 29, 1986, Ser. No. 947,152

Int. Cl.[4] B32B *3/26*

U.S. Cl. 428—212 14 Claims



5. A composite sheet comprising fiber mat and

a fiber free outer layer of thermoplastic material;

a bulk layer comprising fiber mat and thermoplastic resin;

barrier means situated between said fiber free layer and said bulk layer, said fiber free layer, bulk layer and barrier means laminated together, said barrier means limiting movement of fibers from said bulk layer to the fiber free layer.

4,716,073

THIN WALL HIGH PERFORMANCE INSULATION ON WIRE

Stuart K. Randa, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jun. 2, 1986, Ser. No. 869,778

Int. Cl.[4] B32B *7/02*

U.S. Cl. 428—215 3 Claims

1. An electrical wire covered with an extruded fluoropolymer foam layer comprising ethylene/chlorotrifluoroethylene copolymer or ethylene/tetrafluoroethylene copolymer and an extruded fluoropolymer unfoamed skin layer around the foam comprising ethylene/chlorotrifluoroethylene copolymer or ethylene/tetrafluoroethylene copolymer; wherein the foam layer is between 0.05–0.76 mm thick and the skin layer is between 0.013–0.076 mm thick and wherein the foam layer and the skin layer are each formed by separate extrusions, which extrusions can be either simultaneous or in sequence.

4,716,074

POROUS FIBROUS FLUOROCARBON STRUCTURES

John L. Hurley, Mahwah, N.J.; Joseph D. Puzo, Cortland, and Rosa F. Tingey, Ithaca, both of N.Y., assignors to Pall Corporation, Glen Cove, N.Y.

Filed Feb. 10, 1986, Ser. No. 827,537

Int. Cl.[4] B32B *27/00;* D04H *1/64*

U.S. Cl. 428—220 24 Claims

1. A porous, fibrous fluorocarbon structure comprising (1) polytetrafluoroethylene fibers having lengths in the range of from about 4,500 to about 8,500 micrometers, diameters in the range of from about 15 to about 35 micrometers, and aspect ratios of at least about 100, and (2) a fluorinated ethylene-propylene copolymer binder, said structure having a void volume in the range of from about 50 to about 95 percent, a strength of from about 500 to about 2,500 grams per inch of width, a thickness in the range of from about 5 to about 20 mils, a weight of from about 3 to about 25 grams per square foot, an air pressure drop of from about 0.0025 to about 0.1 inch of water at a flow rate of 28 standard cubic feet per minute per square foot of the fibrous structure, and wherein said binder is present in said structure in an amount of from about 10 to about 35 percent by weight of based on the weight of said fibers.

4,716,075

PROTECTED METAL ARTICLE AND METHOD OF MAKING

Christy Christ, Trenton; Herbert F. Campbell, Franklin, both of Ohio; Gayle P. Fields, Ashland, and James L. Burris, Russell, both of Ky., assignors to Armco Inc., Middletown, Ohio

Filed Apr. 10, 1986, Ser. No. 849,986
Int. Cl.[4] D21F *11/00*; D21H *5/12*; B32B *15/00, 17/00*
U.S. Cl. 428—285 5 Claims

1. An article of manufacture including a ferrous base strip having a hot dip metallic coating on at least one side thereof, the improvement comprising:

a heat resistant fibrous layer embedded in said metallic coating,

fibers of said fibrous layer projecting from said metallic coating,

said fibrous layer including a continuous nonwoven, permeable, fusion bonded, composite paper of synthetic polymer staple fiber and fibrid binding agent,

said paper having a tensile strength of at least 10 lbs/in. (18/Ncm) in both the machine and cross directions, an elongation of at least about 5% and having a thickness of at least about 3 mils (0.1 mm),

said polymer having a degradation temperature above the melting point of said metallic coating.

4,716,076

MAGNETIC RECORDING MEDIUM

Akira Morioka; Takeshi Matsuura, both of Kyoto, and Yoshiyuki Takahira, Suita, all of Japan, assignors to Hitachi Maxell, Ltd., Osaka, Japan

Filed Jun. 11, 1985, Ser. No. 743,679
Claims priority, application Japan, Jun. 13, 1984, 59-120948
Int. Cl.[4] G11B *5/706, 5/708*
U.S. Cl. 428—323 7 Claims

1. A magnetic recording medium comprising a magnetic layer, including a magnetic powder, and carbon black, said magnetic powder being comprised of:

iron oxide magnetic powder with more than 30 m^2/g specific surface area measured by BET method, and

chromium dioxide (CrO_2) magnetic powder with more than 30 m^2/g specific surface area measured by BET method and in an amount being within a range of more than 3% to less than 20% by weight in the total amount of the iron oxide powder and the chromium dioxide powder,

said carbon black having a volatile constituent of more than 3% by weight.

4,716,077

MAGNETIC RECORDING MEDIUM

Tsutomu Okita; Hiroshi Hashimoto, and Masashi Aonuma, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jul. 11, 1986, Ser. No. 884,450
Claims priority, application Japan, Jul. 12, 1985, 60-152503
Int. Cl.[4] G11B *5/702*
U.S. Cl. 428—328 17 Claims

1. A magnetic recording medium comprising a non-magnetic support and a magnetic layer, said magnetic layer containing as a binder at least one compound selected from each of the compound groups (A) and (B) that has been exposed to radiation, wherein

(A) is polyvinyl chloride type compounds having a molecular weight of 5,000 to 50,000 containing at least on CO_2H group and at least one carbon-carbon unsaturated bond per molecule and having an acid value of from 1 to 30; and

(B) is polyurethane type compounds having a molecular weight of 1,000 to 100,000 containing at least one $—CO_2H$ group and at least one carbon-carbon unasturated bond per molecule and having an acid value of from 1 to 30, wherein the mixing ratio of compound(s) (A) and compound(s) (B) is from 20/80 to 90/10 parts by weight.

4,716,078

SUBSTRATE FOR A MAGNETIC DISC AND METHOD MANUFACTURING SAME

Nobuyuki Kishine; Tetsuya Imamura, both of Tochigi, and Michihide Yamauchi, Wakayama, all of Japan, assignors to KAO Corporation, Tokyo, Japan

Filed Aug. 8, 1984, Ser. No. 638,770
Claims priority, application Japan, Aug. 8, 1983, 58-144576
Int. Cl.[4] G11B *7/04*
U.S. Cl. 428—336 11 Claims

1. A thermal-resistant magnetic memory storage disc comprising:

a disc of a non-magnetic, molded, glass-like carbon substrate having a flat, smooth, mirror-like surface, and

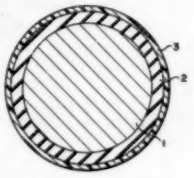
a continuous, thin film of magnetic material deposited on the smooth surface of said substrate.

4,716,079

EXCELLENT WINDABILITY MAGNET WIRE

Fumikazu Sano, Hiratsuka, and Masakazu Mezaki, Yokohama, both of Japan, assignors to The Furukawa Electric Co. Ltd., Tokyo, Japan

Filed Feb. 20, 1987, Ser. No. 16,873
Claims priority, application Japan, Feb. 27, 1986, 61-40429
Int. Cl.[4] B32B *27/00*; D02G *3/00*
U.S. Cl. 428—383 10 Claims



1. An excellent windability magnet wire wherein an insulating layer of a synthetic resin film is formed on a conductor directly or with another insulation in between and a lubricant layer is formed on the insulating layer, the improvement wherein the lubricant layer is made of an intimate mixture of natural wax as a major constituent and thermosetting and fluorocarbon resins compounded therewith.

4,716,080

SIZE COMPOSITION

David F. Lewin, Amarillo, Tex., assignor to Owens-Corning Fiberglass Corporation, Toledo, Ohio

Division of Ser. No. 868,382, May 29, 1986. This application Apr. 9, 1987, Ser. No. 36,412
Int. Cl.[4] B32B *9/00, 15/00*
U.S. Cl. 428—389 3 Claims

1. A glass fiber coated with the in situ dried residue of a substantially chrome-free aqueous sizing composition for glass fiber gun roving which comprises (A) a mixture of emulsified film-forming polymers comprising a polymer of vinyl acetate and ethylene, a polymer of vinyl acetate and an epoxy-functional vinyl monomer, and an unsaturated polyester resin: (B) titanium acetyl acetonate; (C) quaternary salt of ammonium

ethosulfate; (D) a cationic lubricant; and (E) 3-methacryloxypropyltrimethoxysilane or hydrolysate thereof.

4,716,081

CONDUCTIVE COMPOSITIONS AND CONDUCTIVE POWDERS FOR USE THEREIN

John E. Ehrreich, Acton, Mass., assignor to Ercon, Inc., Waltham, Mass.

Filed Jul. 19, 1985, Ser. No. 757,061

Int. Cl.[4] B32B *5/16;* **B05D** *7/00;* **H01B** *1/02*

U.S. Cl. 428—403 **33 Claims**

1. A process of making an electrically conductive metal powder of average particle dimension of less than 0.025 inch comprising cleaning copper powder in a metal-complexing cleaning bath to form a clean powder, therupon plating the surface of the resultant clean powder with a silver coating in a plating solution, while maintaining continuous agitation of said plating solution, rinsing, drying, and then heat treating said powder at a temperature of at least about 130° C. for a period of time effective to enhance its heat-aging stability when loaded into an organic polymer resin matrix.

22. An electrically conductive metal powder formed of a copper core with a continuous, thin, adherent silver coating thereover said powder being characterized by a heat-aging stability which is manifested by the characteristic of the Standard Test, whereby said powder in particle-to-particle contact, within test composition provides means to maintain a volume resistivity of less than 2 ohm-cm in said Test matrix after being subjected to an age test at 195° C. for 500 hours.

4,716,082

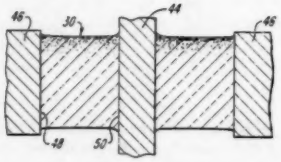
DUPLEX GLASS PREFORMS FOR HERMETIC GLASS-TO-METAL SEALING

John E. Ahearn, Middleboro; Raymond A. Frates, Fairhaven; Dennis Girard; Richard A. Koepke, both of New Bedford, all of Mass.; James K. Schmidt, Mt. Pleasant, and C. Dodd Manon, Ligonier, both of Pa., assignors to Isotronics, Inc., New Bedford, Mass.

Filed Oct. 28, 1986, Ser. No. 924,057

Int. Cl.[4] B32B *17/06*

U.S. Cl. 428—428 **20 Claims**



1. A duplex glass preform for forming hermetic glass-to-metal seals, comprising:

a glass matrix, said glass matrix having a peripheral interfacing surface for glass-to-metal sealing;

a dispersion zone in at least one end of said glass matrix, said dispersion zone extending inwardly from a surface of said at least one end into said glass matrix for a predetermined depth;

a substantially ceramic-free zone intermediate said dispersion zone and said peripheral interfacing surface; and

a plurality of ceramic particles selectively distributed in said dispersion zone of said glass matrix to form a ceramic particle density gradient therein, and wherein said ceramic particle density gradient has a maximum value at said surface and gradually decreases to a near zero value at said predetermined depth.

12. A hermetic glass-to-metal sealed package for microcircuit chips, comprising:

a duplex glass preform, said duplex glass preform further comprising

a glass matrix having a peripheral interfacing surface and at least one terminal bore therethrough substantially parallel to said peripheral interfacing surface, said terminal bore having an interfacing surface,

a dispersion zone in at least one end of said glass matrix, said dispersion extending inwardly from a surface of said at least one end into said glass matrix for a predetermined depth,

a first substantially ceramic-free zone intermediate said dispersion zone and said peripheral interfacing surface,

a second substantially ceramic-free zone intermediate said dispersion zone and said terminal bore interfacing surface, and

a plurality of ceramic particles selectively distributed in said dispersion zone of said glass matrix to form a ceramic particle density gradient therein, and wherein said ceramic particle density gradient has a maximum value at said surface and gradually decreases to a zero value at said predetermined depth;

a terminal pin correspondingly disposed in said at least one terminal bore and hermetically sealed thereto; and

a body having at least one aperture therein adapted to receive said duplex glass preform, and wherein said duplex glass preform is hermetically sealed in said body.

4,716,083

DISORDERED COATING

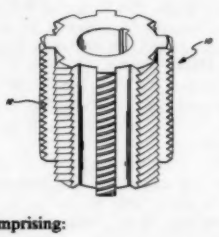
Erwin Eichen, West Bloomfield, and James D. Flasck, Rochester, both of Mich., assignors to Ovonic Synthetic Materials Company, Troy, Mich.

Filed Sep. 23, 1983, Ser. No. 535,352

The portion of the term of this patent subsequent to Jun. 10, 2003, has been disclaimed.

Int. Cl.[4] B32B *9/00, 15/18;* **C23C** *14/00*

U.S. Cl. 428—457 **14 Claims**



1. An article comprising:

a substrate; and

a coating applied to at least a portion of the substrate, the coating comprising a layer adherent to the substrate and consisting of disordered boron and carbon, said layer of disordered boron and carbon formed by sputtering under sputtering conditions to provide said disorder and said adherence.

4,716,084

OIL-IMPREGNATED CAPACITOR

Atsushi Sato, Tokyo; Shigenobu Kawakami, Ichikawa; Keiji Endo, Yokosuka, and Hideyuki Dohi, Tokyo, all of Japan, assignors to Nippon Petrochemicals Company, Limited, Japan

Filed Apr. 18, 1986, Ser. No. 853,546

Claims priority, application Japan, Apr. 19, 1985, 60-82178; Apr. 19, 1985, 60-82179

Int. Cl.[4] B32B *15/08*

U.S. Cl. 428—458 **9 Claims**

1. An oil-impregnated capacitor having at least one wound plastic film which is impregnated with an electric insulating oil, said insulating oil comprising 1-phenyl-1methylphenylethane wherein said 1-phenyl-1-methylphenylethane is present in 1-phenyl-1-(4-methylphenyl)ethane, 1-phenyl-1-(3-methylphenyl)ethane and 1-phenyl-1-(2-methylphenyl)ethane isomeric forms, said 1-phenyl-1-(4-methylphenyl)ethane form

being present in an amount not less than 70 percent based upon the total weight of the 1-phenyl-1-methylphenylethane and said 1-phenyl-1-(2-methylphenyl)ethane form being present in an amount not more than 15 percent based upon the total weight of the 1-phenyl-1-methylphenylethane.

4,716,085

MULTI-LAYERED IONOMER-VINYLIDENE CHLORIDE CONTACT LAMINATED STRUCTURES

John Bisle, Placentia, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Continuation of Ser. No. 714,561, Mar. 21, 1985, abandoned, which is a division of Ser. No. 540,442, Oct. 11, 1983, Pat. No. 4,544,699. This application Jun. 13, 1986, Ser. No. 874,782

Int. Cl.[4] B32B 27/08

U.S. Cl. 428—476.9 34 Claims

1. A multilayered structure useful as a packaging material comprising a first layer being an ionomer polyethylene carboxylate-containing film secured at a temperature between about 130° and 250° F. to a second layer through a vinylidene chloride copolymer adhesive, said adhesive forming a third layer and comprising:

(a) from about 45 to about 90 percent vinylidene chloride

(b) from about 5 to about 25 percent of a polar comonomer having one or more hydroxyl groups

(c) from about 0 to about 30 percent of a plasticizing comonomer for vinylidene chloride, and

(d) a cross-linking agent for hydroxyl groups selected from the group consisting of dialdehydes containing between 2 and about 10 carbon atoms, boric acid, and water soluble metal salts of boric acid.

4,716,086

PROTECTIVE OVERCOAT FOR LOW EMISSIVITY COATED ARTICLE

F. Howard Gillery, Allison Park; Russell C. Criss, and James J. Finley, both of Pittsburgh, all of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 683,458, Dec. 19, 1984, abandoned. This application Dec. 23, 1985, Ser. No. 812,680

Int. Cl.[4] B32B 17/06

U.S. Cl. 428—630 10 Claims

1. A high transmittance, low emissivity article comprising:

a. a transparent nonmetallic substrate;

b. a first transparent antireflective film comprising a metal oxide deposited on a surface of said substrate;

c. a transparent infrared reflective metallic film deposited after said first antireflective metal oxide film;

d. a second transparent antireflective film comprising a metal oxide deposited after said infrared reflective metallic film; and

e. a protective overcoat about 10 to 50 Angstroms thick deposited after said second antireflective metal oxide film comprising a metal oxide having greater durability than said antireflective

metal oxide at the same thickness.

4,716,087

PLATINUM-COPPER ALLOY ELECTROCATALYST AND ACID-ELECTROLYTE FUEL CELL ELECTRODE USING THE SAME

Takashi Ito, Ichikawa; Shigemitsu Matsuzawa, Edogawa, and Katsuaki Kato, Ichikawa, all of Japan, assignors to Nippon Engelhard Ltd., Tokyo, Japan

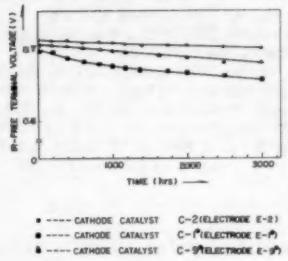
Filed Dec. 10, 1986, Ser. No. 940,246

Claims priority, application Japan, May 16, 1986, 61-110911

Int. Cl.[4] H01M 4/92

U.S. Cl. 429—40 22 Claims

1. A platinum-copper electrocatalyst comprising a carrier and a platinum-copper alloy supported in a well dispersed manner in said carrier, said platinum-copper alloy containing



15 to 50 atomic percent of copper and 85 to 50 atomic percent of platinum.

4,716,088

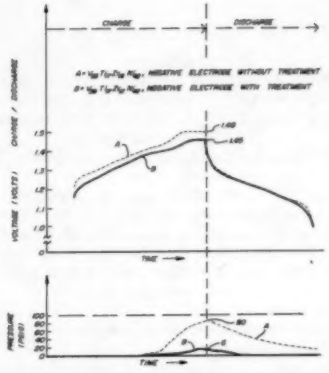
ACTIVATED RECHARGEABLE HYDROGEN STORAGE ELECTRODE AND METHOD

Benjamin Reichman, Birmingham; Srini Venkatesan, Southfield; Michael A. Fetcenko, Royal Oak; Kenneth Jeffries, Pontiac; Sharon Stahl, Mt. Clemens, and Clifford Bennett, Clarkston, all of Mich., assignors to Energy Conversion Devices, Inc., Troy, Mich.

Filed Dec. 29, 1986, Ser. No. 947,148

Int. Cl.[4] H01M 4/36, 10/44

U.S. Cl. 429—101 141 Claims



1. A method of activating a rechargeable hydrogen storage negative electrode containing active electrode material, comprising the steps of

prior to sealing the electrode in a hydrogen storage electrochemical cell:

(a) electrochemically charging said negative electrode to provide a charge; and thereafter

(b) discharging at least a portion of said charge, whereby surface roughness of said negative electrode increases and the gas pressure that develops in a sealed hydrogen storage rechargeable electrochemical cell resulting from said negative electrode is reduced.

4,716,089

PHOTOCONDUCTIVE MEMBER FOR EXHIBITING PHOTOCONDUCTIVITY UPON ILLUMINATION BY ELECTROMAGNETIC LIGHT IN THE VISIBLE TO ULTRAVIOLET RANGE

Mutsuki Yamazaki, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Division of Ser. No. 800,972, Nov. 22, 1985, abandoned. This application Sep. 30, 1986, Ser. No. 913,368

Claims priority, application Japan, Nov. 26, 1984, 59-248088; Nov. 26, 1984, 59-248089; Dec. 12, 1984, 59-262212; Dec. 12, 1984, 59-262215; Feb. 4, 1985, 60-19412; Feb. 4, 1985, 60-19415

Int. Cl.[4] G03G 5/085

U.S. Cl. 430—57 5 Claims

1. A photoconductive member comprising:

a conductive substrate;

a blocking layer disposed on said conductive substrate, said blocking layer comprising amorphous silicon carbide or amorphous silicon nitride and containing 1×10^{-3} to 1.0 atomic % of an element of Group III or V of the Periodic Table;

a first photoconductive layer disposed on said blocking layer, said first photoconductive layer comprising amorphous silicon carbide or amorphous silicon nitride, containing 1×10^{-6} to 1×10^{-3} atomic % of an element of Group III Of the Periodic Table, and the product of the mobility (cm^2/sec V) and the lifetime (sec) of the holes in electron-hole pairs generated in light absorption being 1×10^{-7} cm^2/V or higher;

a second photoconductive layer disposed on said first photoconductive layer, said second photoconductive layer comprising amorphous silicon, having a thickness of 0.1 μm to 5 μm, and containing 1×10^{-6} to 1×10^{-3} atomic % of an element of Group III of the Periodic Table; and

a surface layer disposed on said second photoconductive layer, said surface layer having a thickness of 0.05 to 5 μm and a resistivity of 10^{13} Ω-cm.

4,716,090

PHOTOCONDUCTIVE MEMBER FOR EXHIBITING PHOTOCONDUCTIVITY UPON ILLUMINATION BY ELECTROMAGNETIC LIGHT IN THE VISIBLE TO ULTRAVIOLET RANGE

Mutsuki Yamazaki, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Division of Ser. No. 800,972, Nov. 22, 1985, Pat. No. 4,666,803. This application Sep. 30, 1986, Ser. No. 913,369

Claims priority, application Japan, Nov. 26, 1984, 59-248088; Nov. 26, 1984, 59-248089; Dec. 12, 1984, 59-262212; Dec. 12, 1984, 59-262215; Feb. 4, 1985, 60-19412; Feb. 4, 1985, 60-19415

Int. Cl.[4] G03G 5/14

U.S. Cl. 430—65 4 Claims

1. A photoconductive member comprising:

a conductive substrate;

a first blocking layer which comprises amorphous silicon carbide and is disposed on said conductive substrate, and contains 1×10^{-4} to 1.0 atomic % of an element belonging to Group III or V of the Periodic Table;

a photoconductive layer comprising amorphous silicon and having a thickness of 0.5 to 5 μm; and

a second blocking layer which comprises amorphous silicon nitride, is disposed between said first blocking layer and the photoconductive layer and has a thickness of 5 to 40 μm, contains 1×10^{-3} to 1×10^{-4} atomic % of an element belonging to Group III or V of the Periodic Table, and has a larger optical band gap than those of the first blocking layer and photoconductive layer.

4,716,091

ELECTROPHOTOGRAPHIC MEMBER WITH SILICONE GRAFT COPOLYMER IN SURFACE LAYER

Toshiyuki Yoshihara, Mitaka; Masaaki Hiro, Kanagawa, and Katsunori Watanabe, Yamato, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 18, 1986, Ser. No. 829,935

Claims priority, application Japan, Feb. 19, 1985, 60-29424; Sep. 27, 1985, 60-215494; Sep. 27, 1985, 60-215495; Sep. 27, 1985, 60-215497

Int. Cl.[4] G03G 5/14

U.S. Cl. 430—66 12 Claims

1. An electrophotographic image holding member which comprises a surface layer containing a silicone type comb shaped graft polymer having a silicone portion at the side chain.

4,716,092

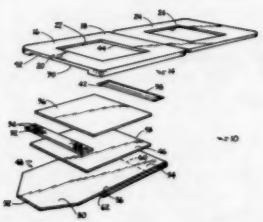
TRANSPARENCY FILM ASSEMBLAGE AND ROLLER ASSEMBLY FOR USE THEREWITH

Paul B. Mason, Magnolia, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Sep. 2, 1986, Ser. No. 902,774

Int. Cl.[4] G03C 5/54, 3/00; G03D 5/02

U.S. Cl. 430—209 4 Claims



1. A transparency film assemblage comprising:

a mount for a film frame, said mount including a first section having first and second opposite ends separated by means for defining a first aperture, and a second section having means for defining a second aperture, said first and second sections being adapted to be located in face-to-face relation with said first and second apertures located in alignment with each other;

a container of processing liquid attached to said first end and located between said first and second sections, said container having a rupturable section located adjacent one side of said first aperture;

means for receiving residual processing liquid, said receiving means being supported by said second end adjacent said first aperture and located between said first and second sections;

an unexposed transparency film frame of the instant type secured to said first section in superposition to and intermediate said first and second apertures, said film frame including a strippable emulsion layer;

a first sheet of material located between said first and second sections in covering relation to said strippable emulsion layer, said first sheet being constructed to assist in the spreading of the processing liquid across said film frame, subsequent to its photographic exposure, so as to initiate the formation of a visible image in said film frame, said first sheet being adapted to strip said emulsion layer from said film frame during the removal of said first sheet from between said first and second sections; and

a second sheet of material having first and second portions separated by an intermediate portion, said intermediate portion being fixedly secured to an end of said first sheet at a location adjacent said rupturable section of said container of processing liquid, said first portion having a free

end and said second portion being of an area at least coextensive to that of said first sheet, whereby pulling on said free end in a direction so as to withdraw it from between said first and second sections of said mount is effective to strip said first sheet and said emulsion layer from said film frame while simultaneously moving said second portion of said second sheet into covering relation with said emulsion layer being carried by said first sheet prior to said first sheet and said second portion of said second sheet being moved from between said first and second sections of said frame.

2. A transparency film assemblage as defined in claim 1 wherein said receiving means comprises a strip of absorbent material.

4,716,093

SOLVENT DEVELOPABLE PHOTORESIST COMPOSITION AND PROCESS OF USE

Richard J. Kempf, Towanda, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 17, 1986, Ser. No. 839,973
Int. Cl.[4] G03C 1/495, 1/68
U.S. Cl. 430—277 14 Claims

1. A solvent developable photopolymerizable composition present as a film with a creep viscosity of at least 20 megapoise comprising

(a) at least one nongaseous ethylenically unsaturated compound having a boiling point above 100° C. at normal atmospheric pressure and being capable of forming a high polymer by photoinitiated addition polymerization,

(b) an initiating system activated by actinic radiation, and

(c) a preformed macromolecular binder soluble in methyl chloroform at a temperature of 22° C. and a time not greater than 24 hours, said binder formed from monomers comprising methylmethacrylate, and C_2 to C_4 alkyl methacrylate. wherein said composition as a film of 0.002 inch thickness laminated to a copper substrate and imagewise exposed to actinic radiation will meet both of the following conditions:

(i) a time to clear of not greater than 26 seconds when the imagewise exposed film is passed at a transport speed of 4.5 feet per minute through a spray of methyl chloroform at a temperature of 65° C. and spray pressure of 20 psi (gauge) whereby all unexposed composition is removed from the substrate and

(ii) a time to strip of the exposed composition of not greater than 9.5 seconds when the exposed composition is passed at a transport speed of 10 feet per minute through a spray of a solution containing by weight 93 parts methylene chloride and 6 parts methanol at a temperature of 65° C. and a spray pressure of 21 psi (gauge) whereby all exposed composition is removed from the substrate.

11. An article present as a wound roll comprising a support film and a cover film which contains between these two films a solvent developable photopolymerizable composition present as a film with a creep viscosity of at least 20 megapoise comprising

(a) at least one nongaseous ethylenically unsaturated compound having a boiling point above 100° C. at normal atmospheric pressure and being capable of forming a high polymer by photoinitiated addition polymerization,

(b) an initiating system activated by actinic radiation, and

(c) a preformed macromolecular binder soluble in methyl chloroform at a temperature of 22° C. and a time not greater than 24 hours. said binder formed from monomers comprising methylmethacrylate and C_2 to C_4 alkyl methacrylate, wherein said composition as a film of 0.002 inch thickness laminated to a copper substrate and imagewise exposed to actinic radiation will meet both of the following conditions:

(i) a time to clear of not greater than 26 seconds when the imagewise exposed film is passed at a transport speed of 4.5 feet per minute through a spray of methyl chloroform at a temperature of 65° C. and spray pressure of 20 psi (gauge) whereby all unexposed composition is removed from the substrate and

(ii) a time to strip of the exposed composition of not greater than 9.5 seconds when the exposed composition is passed at a transport speed of 10 feet per minute through a spray of a solution containing by weight 93 parts methylene chloride and 6 parts methanol at a temperature of 65° C. and a spray pressure of 21 psi (gauge) whereby all exposed composition is removed from the substrate

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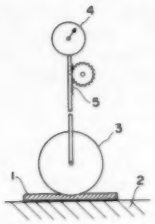
4,716,094

PHOTOSENSITIVE RESIN COMPOSITION WHICH IS IMPROVED WITH RESPECT TO SURFACE TACK-FREE CHARACTERISTIC AFTER CURING, AND A METHOD

Kuniaki Minonishi, and Reijiro Sato, both of Fuji, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Mar. 7, 1985, Ser. No. 709,186
Claims priority, application Japan, Mar. 13, 1984, 59-46472
Int. Cl.[4] G03C 1/68, 1/70
U.S. Cl. 430—284 7 Claims



1. A photosensitive resin composition for use in preparing a printing plate for flexography which is improved with respect to surface tack-free characteristics after curing by exposure to actinic radiation, comprising:

(a) an ethylenically unsaturated prepolymer having a number average molecular weight of 5000 or more per double bond and at least one urethane bond;

(b) an ethylenically unsaturated monomer;

(c) a photoinitiator; and

(d) at least one compound represented by the general formula (I)

$$R^1—X \quad (I)$$

wherein R^1 represents a monovalent hydrocarbon residue represented by C_nH_{2n+1} or C_nH_{2n-1} in which n is an integer of from 11 to 21; and X represents —COOH, —$CONH_2$ or —CH_2OR^2 in which R^2 represents H or —CO—R^3—S—R^3—$COOCH_2$—R^4 in which R^3 is a divalent hydrocarbon residue having 1 to 6 carbon atoms and R^4 has the same meaning as R^1, the weight ratio of said at least one compound to the total weight of said ethylenically unsaturated prepolymer, said ethylenically unsaturated monomer and said photoinitiator being 0.1/100 to 6/100.

3. A photosensitive resin composition according to claim 1, wherein said ethylenically unsaturated prepolymer is an unsaturated polyurethane (meth)acrylate.

4,716,095

METHOD FOR REDUCING COLOR CROSS-CONTAMINATION DURING RE-IMAGING OF PHOTOTACKIFIABLE MATERIALS

Mario Grossa, Dreieich, Fed. Rep. of Germany, assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Nov. 12, 1986, Ser. No. 930,102

Claims priority, application Fed. Rep. of Germany, Nov. 16, 1985, 3540804

Int. Cl.[4] G03C 5/00

U.S. Cl. 430—291 10 Claims

1. Process for improving the reproduction quality of a negative-working, multiple exposure and toning process for preparing powder images on a substrate bearing a layer of a light-sensitive composition comprising at least one 4-(2'-nitrophenyl)-1,4-dihydropyridine compound, and/or a light-sensitive system comprising at least one 1,4-dihydropyridine compound and at least one hexaarylbisimidazole compound, comprising the steps of:

(a) exposing said layer imagewise to actinic radiation to produce tacky image areas,

(b) toning the tacky areas with finely-divided powders, and

(c) repeating the imagewise exposing and toning steps several times using different images for exposure and different toners, wherein the improvement comprises: treating the light-sensitive layer before the first imagewise exposure and/or between each toning step and the subsequent exposure with a strong inorganic or organic acid having a pKa value of $\leqq 2.0$.

2. Process according to claim 1, wherein the light-sensitive layer is treated with a strong volatile acid.

3. Process according to claim 2, wherein the light-sensitive layer is treated with hydrochloric acid.

4. Process according to claim 2, wherein the light-sensitive layer is treated with the vapor of the strong volatile acid.

6. Process according to claim 1, wherein the light-sensitive layer is treated with a finely-divided carrier material charged with the strong acid.

4,716,096

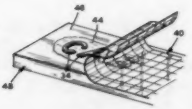
METHOD AND APPARATUS FOR PRODUCING CHARACTERS ON A GRIT-ERODIBLE BODY

Larry L. Cooper, Bowling Green, and Philip G. Saunders, Maumee, both of Ohio, assignors to Container Graphics Corporation, Maumee, Ohio

Continuation-in-part of Ser. No. 458,839, Jan. 18, 1983. This application Nov. 7, 1983, Ser. No. 549,078

Int. Cl.[4] G03C 5/00

U.S. Cl. 430—323 13 Claims



1. A font of type for grit-blasting masks comprising a thin backing sheet, a multiplicity of characters including letters and numerals of one style, releasably affixed in lines to said sheet in orderly, spaced fashion, each of said characters being made of a material which is flexible and resistant to blasting grit.

4,716,097

INCREASED PHOTOPOLYMER PHOTOSPEED EMPLOYING YELLOW LIGHT PREEXPOSURE

Gregory C. Weed, Towanda, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 3, 1986, Ser. No. 830,509

Int. Cl.[4] G03C 5/00, 5/04

U.S. Cl. 430—327 27 Claims

1. A process of increasing the photospeed of a layer of a photopolymerizable composition with subsequent exposure to actinic radiation, said photopolymerizable composition containing

(a) an addition polymerizable ethylenically unsaturated monomer

(b) an initiating system activated by actinic radiation, and

(c) a triarylmethane or xanthene dye wherein the process comprises the steps of:

(1) exposing the layer of the photopolymerizable composition to radiation at a wavelength longer than 400 nm and at an intensity of at least 1500 lumen per square meter for a time sufficient to increase photospeed and

(2) imagewise exposing the photopolymerizable composition with increased photospeed from step (1) to actinic radiation, with the proviso that the dye in (c) is chosen from a triarylmethane or xanthene dye capable of imparting an increase in photospeed of at least two steps as measured on a sixth root of two step wedge exposed film and with the proviso that such increase in photospeed is obtained in step (1).

4,716,098

DEVELOPER FOR PREPARING PRINTING FORMS AND PROCESS THEREFOR

Gerhard Mack; Birgit Mueller, both of Wiesbaden; Guenter Jung, Taunusstein, and Werner Frass, Wiesbaden, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

Filed Oct. 23, 1985, Ser. No. 790,153

Claims priority, application Fed. Rep. of Germany, Oct. 30, 1984, 3439597

Int. Cl.[4] G03F 7/00

U.S. Cl. 430—331 18 Claims

1. A developer mixture for developing a negative-working exposed reproduction layer provided on a base, said mixture comprising water; from about 0.5 to about 13.0% by weight of at least one organic solvent; at least one alkaline agent; about 0.5 to about 9.0% by weight of at least one complexing agent; from about 0.2 to about 12.0% by weight of at least one surface-active agent; from about 0.5 to about 10.0% by weight of at least one emulsifier; about 1.0 to about 7.0% by weight of at least one n-alkanoic compound; and from about 0.5 to about 20.0% by weight of at least one buffer substance, said percentages by weight being based on the total weight of said developer mixture, wherein (A) said surface-active agent has an anionic structure and (B) said n-alkanoic compound is selected from an n-alkanoic acid, an n-alkanoic acid salt, and mixture thereof.

4,716,099

DISPERSIONS OF WATER-INSOLUBLE PHOTOGRAPHIC ADDENDA USING PETROLEUM SULFONATE

Michael J. Simons, Ruislip, England, assignor to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 800,199, Nov. 21, 1985, Pat. No. 4,624,903. This application Jun. 2, 1986, Ser. No. 869,535

Claims priority, application United Kingdom, Nov. 23, 1984, 8429678

Int. Cl.[4] G03C 1/40, 1/38, 1/42, 7/32

U.S. Cl. 430—493 4 Claims

1. A dispersion of a water-insoluble photographic addendum selected from the group consisting of couplers, ultraviolet

absorbers, dyes, redox dye releasers, developing agents, electron transfer agents, oxidized developer scavengers and image stabilizers, in a hydrophilic colloid composition which dispersion contains an oil-soluble petroleum sulfonate which is liquid at 20° C.

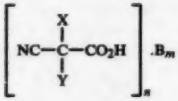
4,716,100

HEAT DEVELOPABLE LIGHT-SENSITIVE MATERIAL

Yoshiharu Yabuki; Kozo Sato; Ken Kawata, and Hiroyuki Hirai, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Aug. 26, 1985, Ser. No. 769,273
Claims priority, application Japan, Aug. 25, 1984, 59-176998
Int. Cl.[4] G03C 1/02
U.S. Cl. 430—570 21 Claims

1. A heat-developable light-sensitive material comprising a silver halide emulsion and containing therein a reducing agent and a base precursor represented by the following general formula (I):



(I)

wherein X and Y, which may be the same or different, each represents a substituent selected from the group consisting of a hydrogen atom, an alkyl group, an alkenyl group, a halogen atom, an alkynyl group, a cycloalkyl group, an aryl group, an aralkyl group, a heterocyclic group, an alkoxy group, and aryloxy group, an alkylthio group, an arylthio group, an amino group, an acylamino group, a nitro group, a cyano group, an alkylsulfinyl group, an arylsulfinyl group, an acyl group, a sulfamoyl group, a substituted sulfamoyl group, a carbamoyl group, a substituted carbamoyl group, an alkoxycarbonyl group, an aryloxycarbonyl group, an aryloxysulfonyl group, a nitroso group, a group of the formula —CO_2H.B wherein B is as defined below, a group of the formula $R^1N{=}CR^2{-}$ wherein R^1 and R^2 each represents a hydrogen atom, an alkyl group or an aryl group, and a hydroxy group, provided that both X and Y are not simultaneously both hydrogen atoms, simultaneously both halogen atoms or one of X and Y is hydrogen and the other is halogen at the same time, and wherein the alkyl moiety or aryl moiety included in the substituent represented by X and Y may further be substituted with a substituent, or X and Y may combine and form a ring; B represents a monoacid or diacid base which has a pKa of 7 or more and contains 12 or less carbon atoms; n and m each represent 1 or 2 and maintains the relationship that the number of positive charges and the number of negative charges are equal.

4,716,101

RAPID ENZYME ASSAY BY PRODUCT SELECTIVE BLOT

Gregory A. Thompson, and Huw M. Davies, both of Davis, Calif., assignors to Calgene, Inc., Davis, Calif.

Filed Dec. 18, 1984, Ser. No. 683,550
Int. Cl.[4] G01N 27/26, 33/52, 33/561
U.S. Cl. 435—4 18 Claims

1. A method for detecting an enzyme in a sample, said method comprising:

reacting the sample with substrate for the enzyme in an aqueous reaction mixture so that a product is produced if enzyme is present in the sample;

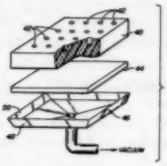
passing the reaction mixture transversely through an image gel having an immobilized phase capable of selectively binding said product but not substrate;

washing the image gel to remove the substrate and other non-bound materials; and

detecting the presence of said product in the image gel.

18. An assay kit for detecting an enzyme, said kit comprising:

an application gel having a plurality of wells for receiving a plurality of samples suspected of containing the enzyme;



an image gel laminated to the application gel and having an immobilized phase dispersed therein for selectively binding a product resulting from reaction of a substrate with said enzyme but not said enzyme substrate; and

means for packaging the application gel and image gel.

4,716,102

PURIFIED AIDS-ASSOCIATED VIRUS ARV-2

Jay A. Levy, San Francisco, Calif., assignor to Regents of the University of California, Berkeley, Calif.

Filed Aug. 15, 1984, Ser. No. 641,167
Int. Cl.[4] G01N 33/543; C12N 7/00, 5/00
U.S. Cl. 435—5 9 Claims

1. Biologically pure AIDS-associated retrovirus, ARV-2, said retrovirus having all the identifying characteristics of the ARV-2 retrovirus that has infected the human T-cell line, ATCC CRL 8597.

4,716,103

CHEMICALLY ACTIVE TRIAZINE SUPPORT COMPOSITION

Hans-Dieter Hunger, Zepernick, and Charles Coutelle, Berlin, both of German Democratic Rep., assignors to Akademie der Wissenschaften der DDR, Berlin, German Democratic Rep.

Filed Aug. 8, 1984, Ser. No. 638,882
Claims priority, application German Democratic Rep., Aug. 9, 1983, 253821; Apr. 24, 1984, 262260; Apr. 24, 1984, 262265; Apr. 24, 1984, 262264; Apr. 24, 1984, 262263; Apr. 24, 1984, 262261
Int. Cl.[4] C12Q 1/68; C12N 11/12; G01N 33/544; C07D 251/00
U.S. Cl. 435—5 46 Claims

1. A composition with chemically active filler components comprising

(a) a polymer compound having no triazine groups in a concentration of 5–80% by volume;

(b) a polymer compound with 4,6-dihalogen-1,3,5-triazine groups in a concentration of 1–80% by volume;

(c) a 2,4,6-trihalogen-1,3,5-triazine filler component in a concentration of 0.5–50% by volume; and

(d) an alkali metal halogenide filler component in a concentration of 0.1–20% by volume.

37. Method for the fixation of cells to a support material comprising:

(a) contacting the cells with a support having chemically active filler components composed of:

(i) cellulose and/or cellulose derivative having no triazine groups in a concentration of 5–80% by volume;

(ii) cellulose and/or cellulose derivative with 4,6-dihalogen-1,3,5-triazine groups in a concentration of 1–80% by volume;

(iii) a 2,4,6-trihalogen-1,3,5-triazine filler component in a concentration of 0.5–50% by volume; and

(iv) an alkali metal halogenide filler component in a concentration of 0.1–20% by volume to form a conjugate of support and cells; and

(b) washing said conjugate of support and cells.

4,716,104

DETECTING PRESENCE OF HCMV-SPECIFIC IGM

William J. Harris, Carnoustie, near Dundee, and Helena F. Hart, Edinburgh, both of Scotland, assignors to Cogent Limited, London, England

Filed Feb. 20, 1985, Ser. No. 703,535

Claims priority, application United Kingdom, Feb. 20, 1984, 8404368

Int. Cl.[4] G01N *33/569, 33/577*

U.S. Cl. 435—5 2 Claims

1. A method for detecting the presence of HCMV-specific IgM in a clinical sample, which comprises:

capturing IgM in a clinical sample with anti-human IgM immobilized on a support,

reacting captured IgM with HCMV antigens, and

detecting the resulting bound HCMV antigens with labelled HCMV-specific monoclonal antibody.

4,716,105

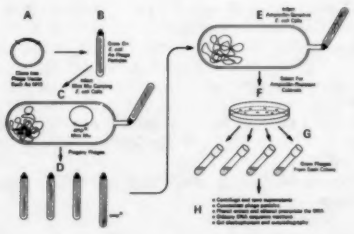
MINI MU CONTAINING PLASMID AND A METHOD FOR RAPID DNA SEQUENCING

Kiyoshi Mizuuchi; Michiyo Mizuuchi, and Toshiro Adachi, all of Bethesda, Md., assignors to The United States of America as represented by the Department of Health and Human Services, Washington, D.C.

Filed Dec. 13, 1984, Ser. No. 680,992

Int. Cl.[4] C12Q *1/70, 1/68;* C12N *15/00*

U.S. Cl. 435—5 12 Claims



3. A method of determining base sequence in a DNA segment comprising:

(a) cloning said DNA segment by incorporation thereof in a cloning vector selected from the group consisting of ColE1 plasmids and M13 DNA phages;

(b) randomly inserting a mini Mu marker transposon of less than 2 kilobases in cloned DNA of step (a);

(c) isolating transposon-containing DNA obtained through step (b);

(d) separating radiolabelled chain terminator reaction products obtained by using radiolabelled nucleotides as precursors and the DNA of step (c) as a template together with universal primer oligonucleotide having sequence complimentary to one of the transposon ends or two oligonucleotides each complimentary to each of the two ends of the transposon; and

(e) identifying the sequence of said bases from said radiolabelled products through suitable gel elctrophoretic means.

4,716,106

DETECTING POLYNUCLEOTIDE SEQUENCES

David J. Chiswell, Aylesbury, England, assignor to Amersham International plc, Buckinghamshire, England

Filed Feb. 28, 1985, Ser. No. 706,747

Claims priority, application United Kingdom, Mar. 1, 1984, 8405437

Int. Cl.[4] C12Q *1/70, 1/68;* G01N *33/566*

U.S. Cl. 435—6 10 Claims

1. A method of detecting a specific target polynucleotide sequence in a sample, comprising the use of

(a) a labelled polynucleotide secondary probe having a complex single-stranded polynucleotide sequence, and

(b) a polynucleotide primary probe having a single-stranded sequence complementary to the target sequence and a complex single-stranded sequence complementary to the complex sequence of the secondary probe,

which method comprises the steps of

(i) contacting the sample under hybridisation conditions with the primary probe,

(ii) before, during or after said contact hybridising the labelled secondary probe to the primary probe, and

(iii) observing the presence or absence of the label in association with the sample as indicating the presence or absence of the target sequence.

4,716,107

METHOD FOR DIAGNOSIS OF A.I.D.S.

Robert L. Gross, 15 Vasquez Ave., San Francisco, Calif. 94127

Continuation of Ser. No. 584,658, Feb. 29, 1984, abandoned. This application Dec. 10, 1986, Ser. No. 941,531

Int. Cl.[4] G01N *33/567, 33/555, 33/564;* C12Q *1/02*

U.S. Cl. 435—7 12 Claims

3. A method for the diagnosis of acquired immune deficiency syndrome in a human subject, comprising:

(a) isolating plasma from a sample of said human subject's blood;

(b) suspending in said plasma a predetermined amount of lymphocytes from a healthy donor;

(c) incubating said suspension with antiserum which specifically binds to T-lymphocytes at a dilution and in an amount selected to inhibit binding of T-lymphocytes in the suspension to sheep red blood cells;

(d) combining said treated suspension with a predetermined quantity of erythrocytes capable of rosette formation with said lymphocytes;

(e) comparing the level of rosette formation in said suspension with a non-inhibiting control level obtained by combining the T-lymphocytes of the healthy donor with an inert suspending medium and said antiserum, further combining said T-lymphocytes, inert suspending medium, and antiserum with erythrocytes capable of rosette formation, and determining the level of rosette formation, to obtain a value representing the percent inhibition of rosette formation attributable to said antiserum; and

(f) comparing the value obtained in step (e) with a control value representing the percent inhibition of rosette formation resulting from the addition of anti-T-lymphocyte antiserum to a T-lymphocyte sample from a healthy donor combined with said erythrocytes, to detect any variation occurring in said value which is attributable to said plasma, as an indication of the presence of acquired immune deficiency syndrome in said subject.

4,716,108

ASSAYING ANTI-TP IGM ANTIBODIES FOR SYPHILIS DIAGNOSIS

Takashi Sato, Saitama; Emiko Kubo, and Takako Kayashima, both of Tokyo, all of Japan, assignors to Fujirebio Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 513,411, Jul. 14, 1983, abandoned. This application Feb. 24, 1986, Ser. No. 833,666

Claims priority, application Japan, Jul. 14, 1982, 57-121244

Int. Cl.[4] G01N *33/53, 33/555, 33/569, 33/571*

U.S. Cl. 435—7 4 Claims

1. A method of measuring anti TP IgM antibodies in a sample comprising the steps of:

(1) adding animal erythrocytes having anti IgM antibodies immobilized thereon, to a liquid sample containing IgM antibodies which have been produced by TP antigens, to allow said anti IgM antibodies to react with said IgM antibodies;

(2) separating from the liquid the animal erythrocytes having anti IgM antibodies immobilized thereon, and which have reacted with said IgM antibodies in step (1);

(3) adding animal erythrocytes having TP antigens immobilized thereon, to a liquid containing said animal erythrocytes separated in step (2) to react TP antigens with IgM antibodies which are specifically reactive to TP antigens, said IgM antibodies being anti TP IgM antibodies, and

(4) correlating the agglutination due to the reaction in step (3) with the amount of anti TP IgM antibodies in the sample.

4,716,109

IMMUNOASSAY

Terence S. Baker, Staines; Michael J. Powell, and Richard C. Titmas, both of Maidenhead, all of England, assignors to Boots-Celltech Diagnostics Limited, Slough, England

Filed Jan. 30, 1984, Ser. No. 575,390

Claims priority, application United Kingdom, Jan. 31, 1983, 8302622; Jul. 26, 1983, 8320164

The portion of the term of this patent subsequent to May 6, 2003, has been disclaimed.

Int. Cl.[4] G01N *33/542;* C12N *9/99*

U.S. Cl. 435—7 18 Claims

1. An enzyme inhibitor-labelled immunoassay for measuring the concentration of an antigenic analyte in a milk sample, the immunoassay involving

(i) the milk sample,

(ii) a conjugate molecule comprising a moiety having at least one antigenic determinant in common with the antigenic analyte, the moiety being bonded to an inhibitor capable of inhibiting the activity of an enzyme capable of clotting milk such that the activity of the inhibitor is reduced or eliminated by the immunochemical binding of an antibody to the moiety,

(iii) an antibody capable of forming an immunochemical bond to the said moiety of the conjugate molecule and to the antigenic analyte and

(iv) an enzyme capable of clotting milk, the assay comprising the steps of allowing a competitive reaction to take place between antigenic analyte in the milk sample, the conjugate molecule and the antibody and determining the activity upon the milk sample of the enzyme capable of clotting milk.

4,716,110

COMPOSITION FOR ASSAYING HYDROGEN PEROXIDE

Hiroshi Wada, Chigasaki, and Yuzo Kosaka, Adachi, both of Japan, assignors to Eiken Kagaku Kabushiki Kaisha, Japan

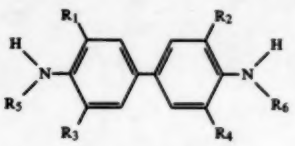
Filed Oct. 24, 1984, Ser. No. 664,309

Claims priority, application Japan, Aug. 22, 1984, 59-174630

Int. Cl.[4] C12Q *1/26, 1/28, 1/54*

U.S. Cl. 435—25 18 Claims

1. A composition for assaying hydrogen peroxide comprising an enzyme, a buffer and a chromogen, wherein said chromogen comprises a sulfoalkyl derivative of a 3,3',5,5'-tetraalkylbenzidine or a water-soluble salt thereof represented by the following general formula I:



(I)

wherein R_1, R_2, R_3 and R_4 are straight-chain alkyl groups having 1 to 6 carbon atoms, selected from the group consisting of a methyl, ethyl, n-propyl, n-butyl, n-amyl and n-hexyl group, and one of R_5 and R_6 represents a sulfoalkyl group of the following formula II:

$$-(CH_2)_nSO_3H \quad \text{(II)}$$

wherein n represents an integer of 1 to 6 and wherein the sulfoalkyl group is substituted with at least one hydroxyl group, the other one of R_5 and R_6 representing a member selected from the the group consisting of a hydrogen atom and said sulfoalkyl group.

4,716,111

PROCESS FOR PRODUCING HUMAN ANTIBODIES

Michal E. Osband, Brookline, and Joy A. Cavagnaro, Boston, both of Mass., assignors to Trustees of Boston University, Boston, Mass.

Continuation of Ser. No. 407,236, Aug. 11, 1982, abandoned. This application Jan. 30, 1985, Ser. No. 696,546

Int. Cl.[4] C12P *21/00;* C12N *15/00, 5/00*

U.S. Cl. 435—68 6 Claims

1. A process for producing a human antibody which comprises collecting mononuclear cells depleted of suppressor cells from the autologous blood of a human patient not previously exposed to an antigen which elicits and human antibody, adding to said mononuclear cells an antigen capable of initiating the production of said human antibody, adding to said mononuclear cells autologous serum from said patient and incubating said mononuclear cells, antigen and autologous serum in the presence of a non-specific lymphocyte activator for a period of time sufficient to effect the production of a human antibody.

4,716,112

VECTORS FOR INCREASED EXPRESSION OF CLONED GENES

Nikos Panayotatos, Geneva, Switzerland, assignor to Biogen N.V., Curacao, Netherlands Antilles

Continuation of Ser. No. 531,235, Sep. 12, 1983, abandoned. This application Feb. 11, 1986, Ser. No. 829,456

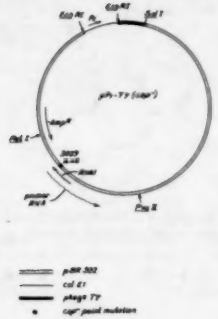
Claims priority, application United Kingdom, Sep. 16, 1982, 8226409

Int. Cl.[4] C12P *21/00;* C12N *15/00, 1/20, 1/00*

U.S. Cl. 435—68 8 Claims

1. An improved expression vector comprising an expression control sequence, said sequence comprising at least one promoter selected from the group consisting of a promoter of RNA I and a promoter of primer RNA for initiation of DNA replication; a DNA sequence within the replicon of the vector encoding RNA I and the primer RNA for initiation of DNA replication and their regulatory regions, said DNA sequence having an AT to GC mutation at position 3029 in the two strands of pBR322, said mutation increasing the copy number of the vector in a host as compared to a vector without such mutation and further amplifying the expression of genes and DNA sequences under the control of said expression control sequence of said vector beyond the amplification expected by

the copy number increase; and at least one restriction site for insertion of a DNA sequence encoding a desired polypeptide



into said vector and operatively linking the DNA sequence to said expression control sequence.

4,716,113

PROCESS FOR THE PRODUCTION OF AN (S)-METHYL OR (S)-ETHYL 4-AMINO-6-FLUOROCHROMAN-4-CARBOXYLATE

Frank J. Urban, Waterford, Conn., assignor to Pfizer Inc., New York, N.Y.

Division of Ser. No. 642,008, Aug. 20, 1984, abandoned. This application Mar. 31, 1986, Ser. No. 846,383

Int. Cl.[4] C12P *17/06*; C07P *41/00*; C07D *311/04*

U.S. Cl. 435—125 **1 Claim**

1. A process for preparing an (S)-methyl or (S)-ethyl 4-amino-6-fluoro-chroman-4-carboxylate by subjecting 4-amino-6-fluorochroman-4-carboxylic acid or (2R)-4-amino-6-fluoro-2-methylchroman-4-carboxylic acid in the form of a hydrohalide acid addition salt to the sequence of steps comprising:

(a) esterification with thionyl chloride and the appropriate lower alkanol, followed by basification to form an intermediate racemic methyl or ethyl ester; and

(b) resolution of said intermediate racemic ester by treatment with α-chymotrypsin to afford the desired (S)-methyl or (S)-ethyl ester in pure form.

4,716,114

PROCEDURE FOR THE ENHANCEMENT OF THE RESISTANCE TO ARSENITE AND ARSENATE OF *THIOBACILLUS FERROOXIDANS* AND *BACILLUS SUBTILIS*

Claude Nicolau, La Chapelle Saint Mesmin, and Jacques Raimond, ST Jean la Ruelle, both of France, assignors to Inverko Industrie Vertriebs Kontor GmbH & Co., KG, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 496,390, May 20, 1983, abandoned. This application Apr. 3, 1985, Ser. No. 719,337

Claims priority, application Fed. Rep. of Germany, May 24, 1982, 3219440

Int. Cl.[4] C12N *15/00*

U.S. Cl. 435—172.3 **6 Claims**

1. A process for increasing the resistance of a bacterial strain to As(III) and As(V), comprising transforming a first bacterial strain selected from a group of transformable bacterial strains, said group consisting of *Thiobacillus ferrooxidans* and *Bacillus subtilis* by a plasmid carrying resistance to As(III) and As(V) which is capable of expression of said resistance in said first strain.

4,716,115

DERIVED NISIN PRODUCING MICROORGANISMS, METHOD OF PRODUCTION AND USE AND PRODUCTS OBTAINED THEREBY

Carlos F. Gonzalez, and Alfred J. Gryczka, both of Sarasota, Fla., assignors to Microlife Technics, Inc., Sarasota, Fla.

Continuation of Ser. No. 529,614, Sep. 6, 1983, abandoned. This application Jul. 11, 1986, Ser. No. 884,890

Int. Cl.[4] C12N *15/00, 1/20*; C12P *21/00, 21/04*

U.S. Cl. 435—172.3 **18 Claims**

1. A nisin producing engineered bacterium of the genus Streptococcus which contains foreign DNA which encodes for nisin production, which foreign DNA was obtained from a nisin producing donor bacterium and which foreign DNA was transferred to a recipient bacterium resulting in the nisin producing engineered bacterium, wherein the donor bacterium is a naturally occurring Streptococcus species containing plasmid DNA from a 29 Mdal plasmid encoding for sucrose utilization and nisin production and nisin resistance and wherein the recipient bacterium is a Streptococcus species which is sensitive to nisin and which does not naturally produce nisin.

4,716,116

PROTEIN MODIFICATION TO PROVIDE ENZYME ACTIVITY

Melvin H. Keyes, Sylvania, Ohio, assignor to Owens-Illinois Glass Container Inc., Toledo, Ohio

Filed Dec. 4, 1980, Ser. No. 212,782

The portion of the term of this patent subsequent to Sep. 2, 2003, has been disclaimed.

Int. Cl.[4] C12N *9/00, 9/14*

U.S. Cl. 435—183 **9 Claims**

1. A process to produce a modified protein from a negative protein comprising the steps of:

selecting one enzyme to be molded, said enzyme having an enzymatic activity different from said native protein;

selecting a native protein to be modified to model said enzyme;

admixing said native protein with a denaturing agent for a time at a temperature sufficient to partially denature said native protein so as to perturb the shape or conformation of said native protein without causing an irreversible, gross denaturation;

admixing the resulting partially denatured native protein with a competitive inhibitor of said model enzyme; and

admixing said partially denatured native protein and said inhibitor with a cross-linking agent for a time and at a temperature sufficient to cross-link said partially denatured native protein by forming covalent bonds between reactive sites on said partially denatured native protein in the presence of said inhibitor and produce a modified protein having the biological activity of said model enzyme.

4,716,117

MONOCLONAL ANTIBODIES TO FACTOR VIIIC

George Kuo; Frank R. Masiarz, both of San Francisco; Martha Truett, Oakland; Pablo Valenzuela, San Francisco, all of Calif.; Mirella E. Rasmussen, Copenhagen, Denmark, and Jennifer Favaloro, Victoria, Australia, assignors to Chiron Corporation, Emeryville, Calif. and Nordisk Gentofte, Gentofte, Denmark

Continuation-in-part of Ser. No. 664,919, Oct. 26, 1984, abandoned, which is a continuation-in-part of Ser. No. 570,062, Jan. 12, 1984. This application Jan. 7, 1985, Ser. No. 689,274

Int. Cl.[4] A61K *39/395*; G01N *33/597*

U.S. Cl. 435—240.27 **4 Claims**

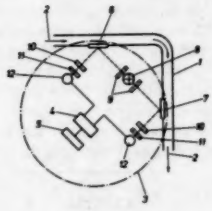
1. A hybridoma cell line selected from the group consisting of cell line 42, cell line 47, cell line 56, cell line 1-28, cell line 4E5, cell line 5B1, and, cell line 2B6.

4,716,118

METHOD FOR DETERMINING IONIC STRENGTH OF A SAMPLE

Otto S. Wolfbeis, and Helmut Offenbacher, both of Graz, Austria, assignors to AVL AG, Schaffhausen, Switzerland

Continuation of Ser. No. 640,881, Aug. 15, 1984, abandoned.
This application Aug. 21, 1986, Ser. No. 898,804
Claims priority, application Austria, Aug. 26, 1983, 3061/83
Int. Cl.[4] G01N *21/77, 33/52*
U.S. Cl. 436—2 2 Claims



1. A method for determining an ionic strength value of an electrolytic solution having a certain ionic concentration, said method comprising the steps of

(a) providing two identical carrier materials, each of said two carrier materials comprising glass and having a carrier surface,

(b) treating said carrier surface of each of said two carrier materials with aminopropyl triethoxysilane and dichlorodimethylsilane to obtain high concentrations of ammonium groups on each of said carrier surfaces and block any silicate anions remaining on each of said carrier surfaces,

(c) providing a pH indicator substance,

(d) chemically coupling said indicator substance to said treated carrier surface of each of said two carrier materials,

(e) chemically modifying the carrier surface of at least one of said two carrier materials to which said indicator substance has been chemically coupled in step (d) by treatment with an acid chloride so as to provide the carrier surface of one of said two carrier materials with a different microenvironment than the carrier surface of the other of said two carrier materials, thus providing two optical sensors which will respond differently to the ionic strength value of said electrolytic solution,

(f) measuring the pH of said electrolytic solution using said two optical sensors, thus obtaining two differing pH measurement values,

(g) calculating a difference between said two differing pH measurement values obtained in step (f), and

(h) empirically inferring the ionic strength value of said electrolytic solution from said difference calculated in step (g).

4,716,119

CONTROL SERUM AND PROCESS THEREFOR

Helmut Rehner, Weilheim, and Peter Roeschlau, Seeshaupt, both of Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Fed. Rep. of Germany

Division of Ser. No. 663,832, Oct. 23, 1984, abandoned, which is a continuation of Ser. No. 350,867, Feb. 22, 1982, abandoned.
This application Oct. 7, 1986, Ser. No. 917,240
Claims priority, application Fed. Rep. of Germany, Feb. 25, 1981, 3107060
Int. Cl.[4] G01N *31/00*
U.S. Cl. 436—16 1 Claim

1. Process for preparation of a calibration/control serum containing a desired component, comprising preparing an aqueous solution of said component, lyophilizing said solution to form a lyophilizate, reconstituting said lyophilizate with an aqueous medium wherein prior to lyophilization there is added to said solution 0.5 to 10% by weight of the reconstituted solution of a compound selected from the group consisting of sodium acetate, triethanolammonium acetate, tetramethyldiethyleneammonium diacetate, tetramethylethylenediammonium diacetate, tetramethylammonium acetate and combinations thereof, and adding said reconstituted solution to a serum sample.

4,716,120

STABLE ALLERGENIC EXTRACTS AND METHODS

Yuh-Geng Tsay, San Jose; Myron A. Beigler, Los Altos Hills; Emanuel Calenoff, Burlingame; Gerald L. Friesen, Vacaville, and James L. Nichols, Los Altos, all of Calif., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 476,187, Mar. 17, 1983, abandoned.
This application Nov. 25, 1985, Ser. No. 801,649
Int. Cl.[4] A61K *39/00;* G01N *33/53*
U.S. Cl. 436—513 23 Claims

1. A substantially dried, purified allergenic extract substantially free from extracted components with molecular weights outside the range of 1000 to 100,000 daltons, having an allergen composition substantially the same as the original extract, and which upon aqueous reconstitution yields a transparent, colorless solution which has an increase in absorbance in the range of 400 to 700 nm of less than 0.01 O.D. after storage for 18 days at 22° C.

12. A process for increasing stability of an allergenic extract comprising

(a) passing an aqueous solution of an allergenic extract through 100,000 and 1000 dalton ultrafilters and retaining substantially all of the fraction having a molecular weight of from 1000 to 100,000 to yield an allergenic extract;

(b) contacting the allergenic extract obtained in Step (a) with a quantity of a carbon absorbent and with a gel polymer absorbent which forms a cage structure in aqueous media which is sufficient to clarify the extract, to yield a retained fraction; and

(c) substantially drying the retained fraction obtained in Step (b) to yield an allergenic product which upon aqueous reconstitution yields a transparent, colorless solution which has an increase in absorbance in the range of 400 to 700 nm of less than 0.01 O.D. after storage for 18 days at 22° C.

4,716,121

FLUORESCENT ASSAYS, INCLUDING IMMUNOASSAYS, WITH FEATURE OF FLOWING SAMPLE

Myron J. Block, North Salem, N.H., and Tomas B. Hirschfeld, Livermore, Calif., assignors to Ord, Inc., Nahant, Mass.

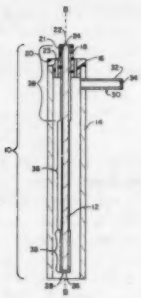
Filed Sep. 9, 1985, Ser. No. 773,940
Int. Cl.[4] G01N *33/533, 33/552, 21/64, 35/00*
U.S. Cl. 436—514 11 Claims

1. In a method for performing assays involving measurement of fluorescence excited in a fluid sample by an evanescent wave at a surface region of a totally internally reflecting substrate, the improvement comprising:

exciting said fluorescence while flowing through an enclosure of fixed dimensions bounded in part by said region, a sufficient volume of said sample to maintain said enclosure filled with flowing sample.

4. In apparatus for assaying a fluid sample, said apparatus including a totally internally reflecting substrate transmissive to radiation capable of exciting fluorescence in fluorescent material disposed at least on a portion of the surface of said substrate, said substrate also being transmissive to said fluorescence, and means spaced from at least said portion of said surface of said substrate so as to define an enclosure bounded in part by said portion, the improvement comprising:

means for flowing substantially continuously said sample over at least said portion of said surface and in sufficient



volume to fill said enclosure, while exciting said fluorescence.

4,716,122

CARRIER MATERIAL FOR USE IN IMMUNE DETERMINATIONS

Hans Scheefers, Giessen, Fed. Rep. of Germany, assignor to Organogen Medizinisch-Molekularbiologische Forschungsgesellschaft m.b.H., Heidelberg, Fed. Rep. of Germany

Filed Sep. 26, 1985, Ser. No. 780,378

Claims priority, application Fed. Rep. of Germany, Sep. 28, 1984, 3435744

Int. Cl.[4] G01N *33/543, 33/544, 33/545, 33/549*

U.S. Cl. 436—532 **9 Claims**

1. A carrier having a covalently bound reaction component of an immunological reaction, for use in immune determinations comprising the reaction component covalently bound to a heterobifunctional photoactivatable compound, one group of which is formed by an aryl azide group linked to an inert polyethylene carrier.

4,716,123

SOLID PHASE BIOLOGICAL DIAGNOSTIC ASSAY VIA VISUAL OBSERVATION AS ENHANCED BY MIE SCATTERING

David E. Wood, Chelsea, Mich., assignor to Covalent Technology Corporation, Ann Arbor, Mich.

Continuation of Ser. No. 501,268, Jun. 6, 1983, abandoned, which is a continuation-in-part of Ser. No. 469,939, Feb. 25, 1983, abandoned, which is a continuation-in-part of Ser. No. 224,984, Jan. 14, 1981, abandoned. This application Aug. 20, 1986, Ser. No. 898,874

Int. Cl.[4] G01N *33/546*

U.S. Cl. 436—533 **45 Claims**

1. In a method of assaying an aqueous sample containing a specifically binding biomaterial having a binding site which is a specific binding partner to a biological substance by observation in light including a selected wavelength in the visual range, said specifically binding biomaterial being in association with other biometerials, comprising:

(1) contacting a solid support having a water insoluble macroextensive surface capable of associating with said specifically binding biomaterial with said aqueous sample for a time sufficient for said specifically binding biomaterial to associate with said macroextensive surface;

(2) separating said support from contact with said aqueous sample;

(3) contacting said macroextensive surface with an aqueous solution containing a plurality of particles having particle surfaces bearing said biological substance associated therewith for a time sufficient for said binding site to bind to said biological substance and to thereby bind said particles to said macroextensive surface;

(4) separating said support from said aqueous solution;

(5) rinsing said support to remove any non-bound particles; and

(6) observing the degree of adherence of said particles to said macroextensive surface to thereby perform said assay; the improvement comprising attaining increased speed, ease of assaying, specificity and selectivity,

wherein said partices are synthetic polymeric particles and said plurality of synthetic particles are substantially spherical having an average diameter which falls within a range of from about 0.2 micron to about 11.1 microns, are of the substantially the same size within said range and have substantially the same selected refractive index, all as calculated by Mie scattering for clear visual observation of said particles when said particles are adhered to said macroextensive surface and are viewed in light including said wavelength.

4,716,124

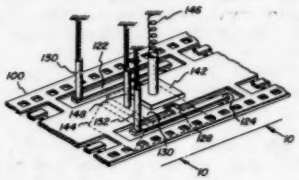
TAPE AUTOMATED MANUFACTURE OF POWER SEMICONDUCTOR DEVICES

Alexander J. Yerman, and James A. Loughran, both of Scotia, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 616,756, Jun. 4, 1984, Pat. No. 4,635,092. This application Aug. 20, 1986, Ser. No. 898,082

Int. Cl.[4] H01L *23/26*

U.S. Cl. 437—8 **13 Claims**



1. A process for manufacturing a power semiconductor device comprising the steps of:

(a) providing a metal tape carrier including a series of sprocket holes adapted to be engaged by a drive mechanism for automated movement of said tape carrier;

(b) providing a plate-shaped power chip having a first main current electrode on a first major chip surface and a second main current electrode and at least one control electrode on a second major chip surface, respectively;

(c) bonding said second main current electrode to a major surface of said metal tape carrier; and

(d) forming a control lead for contact with said control electrode, said control lead being formed from said tape carrier by severing and electrically isolating an elongated portion of said carrier from the remainder of said carrier.

4,716,125

METHOD OF PRODUCING SEMICONDUCTOR LASER

Masao Makiuchi, Atsugi, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Nov. 26, 1986, Ser. No. 935,323

Claims priority, application Japan, Nov. 30, 1985, 60-270509

Int. Cl.[4] H01L *21/203, 21/223, 21/225, 21/265*

U.S. Cl. 437—22 **12 Claims**

1. A method of producing a semiconductor laser comprising the steps of:

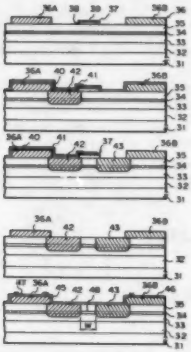
forming a first high resistance clad layer, having a first band gap, on a semi-insulating semiconductor substrate;

forming an active layer of a multiquantum well structure, in

which quantum wells have a second band gap narrower than said first band gap, on said first clad layer;

forming a second high resistance clad layer on said active layer, said second clad layer having a property of reducing the diffusion coefficient of impurities toward the upper surface thereof, from the active layer side, the lower portion of said second clad layer having a third band gap wider than said second band gap;

selectively thermally diffusing first impurity atoms into said first clad layer through a first portion of said second clad layer and a first portion of said active layer, so that said



first portion of said active layer is disordered and the diffused portions form a first conduction region of a first conductivity type; and

selectively thermally diffusing second impurity atoms into said clad layer through a second portion of said second clad layer and a second portion of said active layer at a desired distance from said first portion of said active layer, so that said second portion of said active layer is disordered and the diffused portions form a second conduction region of a second conductivity type opposite to that of said first conductivity type.

4,716,126

FABRICATION OF DOUBLE DIFFUSED METAL OXIDE SEMICONDUCTOR TRANSISTOR

Adrian I. Cogan, San Jose, Calif., assignor to Siliconix Incorporated, Santa Clara, Calif.

Filed Jun. 5, 1986, Ser. No. 871,006
Int. Cl.[4] H01L *21/265, 21/316*
U.S. Cl. 437—24 **4 Claims**

1. A process for fabricating a double diffused metal oxide semiconductor transistor structure comprising the steps of:

sequentially forming on a silicon substrate a thin film of gate oxide, a layer of polysilicon, and a first layer of thermally grown oxide;

etching a window through said layers and said thin film whereby said polysilicon layer is configured into gate regions having side walls and a window between said gate regions;

implanting nitrogen in said semiconductor substrate window region for forming an oxidation inhibitor to silicon;

thermally growing a second layer of silicon oxide over said side walls of said gate regions and over said window forming thereby a thin oxide pad over said window;

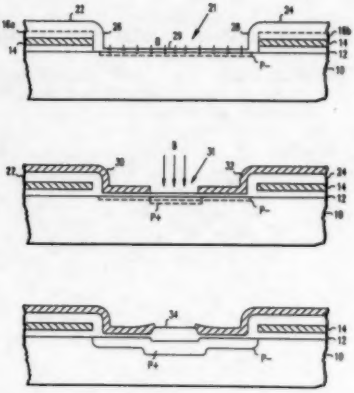
implanting P-type impurity material below said window;

forming silicon nitride over said second layer of thermally grown silicon oxide and patterning by masking and etching said silicon nitride to form spaced regions that define a narrow window therebetween;

implanting P+ type impurity material through said narrow window between said gate regions;

growing a localized oxide plug over said implanted P+ region by a drive-in diffusion and oxidation cycle;

implanting N-type material to form a junction adjacent to said gate region; and



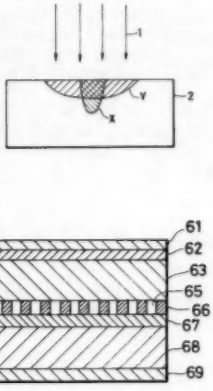
opening access to said gate regions for defining metal contact regions.

4,716,127

METHOD OF IMPLANTING SPATIALLY CONTROLLED P-N JUNCTIONS BY FOCUSED ION BEAMS CONTAINING AT LEAST TWO SPECIES

Shoji Shukuri, Koganei; Masao Tamura, Tokorozawa; Yasuo Wada, and Yoshihisa Fujisaki, both of Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Apr. 15, 1986, Ser. No. 852,317
Claims priority, application Japan, Apr. 15, 1985, 60-78347
Int. Cl.[4] H01L *21/265;* G01N *23/00*
U.S. Cl. 437—27 **15 Claims**



1. A method of manufacturing a semiconductor device comprising the step of irradiating a desired part of a workpiece with a focused ion beam which contains at least two species of

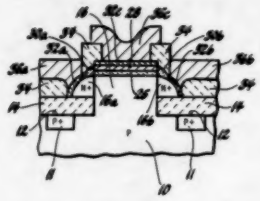
impurity ions to be simultaneously implanted, thereby to simultaneously implant said at least two species of impurity ions into said desired part, the at least two species having spatial distributions of ion current density within the focused ion beam that are different from each other.

4,716,128

METHOD OF FABRICATING SILICON-ON-INSULATOR LIKE DEVICES

Peter J. Schubert, and Nadeem S. Alvi, both of Kokomo, Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed Dec. 10, 1986, Ser. No. 940,255
Int. Cl.[4] H01L *21/365, 41/425*
U.S. Cl. 437—41 **9 Claims**



9. A process for forming a semiconductor device comprising the steps of:

forming an insulating layer over a surface of a semiconductor body;

forming a hole in the insulator layer for exposing a portion of the surface of the semiconductor body;

growing epitaxially semiconductor material from the exposed portion of the surface of the semiconductor body vertically upward in the hole;

removing portions of the insulator layer to expose an opposed pair of vertical sidewall portions of the vertically grown semiconductor material; and

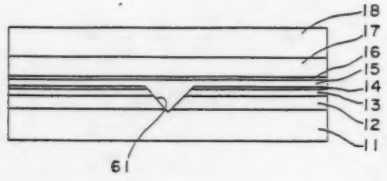
growing epitaxially semiconductor material laterally from said opposed pair of exposed sidewall portions of the vertically grown semiconductor material to form first and second regions which are separated by portions of vertically grown semiconductor material which serve as a third region of the device.

4,716,129

METHOD FOR THE PRODUCTION OF SEMICONDUCTOR DEVICES

Mototaka Taneya; Sadayoshi Matsui, and Mitsuhiro Matsumoto, all of Tenri, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jan. 6, 1986, Ser. No. 816,569
Claims priority, application Japan, Jan. 14, 1985, 60-4760
Int. Cl.[4] H01L *21/208*
U.S. Cl. 437—96 **11 Claims**



1. A method for the production of semiconductor devices which comprises:

forming a non-Te-doped layer on a Te-doped layer, said non-Te-doped layer having the same polarity as said Te-doped layer, and

forming an upper layer on said non-Te-doped layer, said upper layer having a polarity different from that of said Te-doped layer,

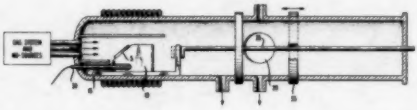
wherein said layers comprise semiconductors of Groups III to V of the periodic table and wherein said layers are formed by liquid phase epitaxy.

4,716,130

MOCVD OF SEMI-INSULATING INDIUM PHOSPHIDE BASED COMPOSITIONS

Wilbur D. Johnston, Jr., Mendham, and Judith A. Long, Millburn, both of N.J., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Continuation of Ser. No. 604,370, Apr. 26, 1984, abandoned, which is a continuation-in-part of Ser. No. 544,215, Oct. 21, 1983, abandoned. This application Feb. 20, 1986, Ser. No. 831,113
Int. Cl.[4] H01L *7/36, 21/205, 21/84*
U.S. Cl. 437—104 **24 Claims**



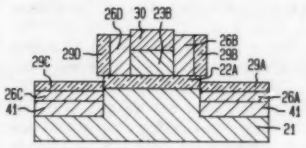
1. A process for producing a device comprising the steps of (1) forming a region of a semi-insulating indium phosphide-based material by contacting a substrate with a deposition gas stream and (2) forming the active region of said device CHARACTERIZED IN THAT said semi-insulating region is formed by introducing a dopant precursor comprising a composition chosen from the group consisting of ferrocene based compositions and iron pentacarbonyl based compositions into said deposition gas stream, wherein said deposition gas stream is produced by combining entities including an organo-indium compound and a source of phosphorus wherein the mole ratio of iron to indium in said gas stream is less than 1.2×10^{-4}, and whereby said semi-insulating indium phosphide has a resistivity of at least 10^6 ohm-cm.

4,716,131

METHOD OF MANUFACTURING SEMICONDUCTOR DEVICE HAVING POLYCRYSTALLINE SILICON LAYER WITH METAL SILICIDE FILM

Takeshi Okazawa, and Yoshiyuki Hirano, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Nov. 28, 1984, Ser. No. 675,768
Claims priority, application Japan, Nov. 28, 1983, 58-223717; Nov. 30, 1983, 58-225814
Int. Cl.[4] H01L *21/283*
U.S. Cl. 437—200 **2 Claims**



1. A method of manufacturing a semiconductor device comprising steps of forming a first silicon oxide film on the major surface of a single crystal silicon substrate, forming a polycrystalline silicon layer on said first silicon oxide film, forming an

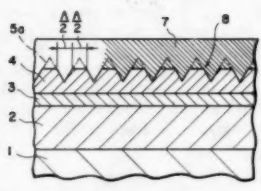
oxidation resisting layer on said polycrystalline silicon film, patterning said oxidation resisting film and said polycrystalline silicon layer, depositing a first metal film continuously on an exposed side surface of the patterned polycrystalline silicon layer and on an exposed major surface of said substrate in the vicinity of said patterned polycrystalline silicon layer via said first silicon oxide film, performing a heat treatment to form a first metal silicide film at said exposed side surface of said patterned polycrystalline silicon layer and a second metal silicide film at said exposed major surface of said substrate and to leave a portion of said first metal film on said first silicon oxide film unconverted into metal silicide, removing said portion of said first metal film left unconverted into metal silicide from the surface of said first silicon oxide film between said first and second metal silicide films to separate said first metal silicide film from said second metal silicide film, performing thermal oxidation to convert surface portions of said first and second metal silicide films into second oxide films, and thereafter removing said oxidation resisting film to expose said upper surface of said patterned polycrystalline silicon layer, depositing a second metal film on the whole surface including said upper surface of said polycrystalline silicon layer from which said oxidation resisting film has been removed, applying a heat treatment to form a third metal silicide film on said upper surface of said silicon layer, and removing said second metal film at the regions where said second metal silicide is not formed.

4,716,132

METHOD OF MANUFACTURING A DISTRIBUTED FEEDBACK TYPE SEMICONDUCTOR DEVICE

Shoji Hirata, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Jan. 13, 1987, Ser. No. 2,972
Claims priority, application Japan, Jan. 14, 1986, 61-5725
Int. Cl.⁴ H01L *21/208*
U.S. Cl. 437—228 **2 Claims**



1. A method of manufacturing a distributed feedback type semiconductor laser comprising a first cladding layer **2**, an active layer **3** disposed on said first cladding layer, a guiding layer **4** disposed on said active layer and a second cladding layer **7** disposed on said guiding layer respectively, in which a grating **8** is disposed to said guide layer, wherein the method comprises the steps of:

forming a predetermined material layer on said guide layer,

selectively etching said material layer and said guide layer until said guide layer is at least partially exposed thereby forming undulation substantially in a trigonal waveform to the surface of said material layer and said guiding layer, and

forming said second cladding layer so as to cover said unevenness.

4,716,133

METHOD FOR PRODUCTION OF SILICON NITRIDE SINTERED BODY

Akito Horiuchi, Kokubu; Kiyoshi Yokoyama, Kagoshima, and Makoto Yoshida, Kokubu, all of Japan, assignors to Kyocera Corporation, Kyoto, Japan

Filed Mar. 31, 1986, Ser. No. 846,701
Int. Cl.⁴ C04B *35/58*
U.S. Cl. 501—97 **18 Claims**

1. A method for the production of a silicon nitride sintered body, which comprises molding a fine powder of an alloy comprising metallic silicon and a metal of the group IIIa of the Periodic Table, subjecting the molded body to a nitriding treatment by calcination in a nitrogen-containing atmosphere and sintering the nitrided molded body at a temperature higher than the nitriding treatment temperature.

4,716,134

DIELECTRIC CERAMIC COMPOSITION

Takashi Yamaguchi; Isao Ishiguchi, both of Chichibu, and Takeshi Inoue, Sakura, all of Japan, assignors to Mitsubishi Mining and Cement Co., Ltd., Tokyo, Japan

Filed Nov. 12, 1986, Ser. No. 930,581
Claims priority, application Japan, Dec. 10, 1985, 60-277610
Int. Cl.⁴ C04B *35/46*
U.S. Cl. 501—136 **8 Claims**

1. A dielectric ceramic composition which comprises $(Pb,La)(Zr,Ti)O_3$ and $Pb(Mg_{1/3}Nb_{2/3})O_3$ in the ratio defined by the formula below,

$$x(Pb_{1-u}La_u)(Zr_{1-v}Ti_v)O_3\cdot(1-x)Pb(Mg_{1/3}Nb_{2/3})O_3$$

wherein

$1.0 \leqq u \leqq 0.28$

$0.25 \leqq v \leqq 1.00$

$0.03 \leqq x \leqq 0.50$.

4,716,135

ORGANOPHOSPHORUS-MODIFIED ZEOLITES AND METHOD OF PREPARATION

Catherine S. H. Chen, Berkeley Heights, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 808,973, Dec. 16, 1985, Pat. No. 4,658,079, which is a continuation-in-part of Ser. No. 709,143, Mar. 7, 1985, Pat. No. 4,568,786, which is a continuation-in-part of Ser. No. 598,139, Apr. 9, 1984, Pat. No. 4,520,221. This application Nov. 18, 1986, Ser. No. 932,051
Int. Cl.⁴ B01J *29/04, 27/14*
U.S. Cl. 502—62 **13 Claims**

1. A surface-inactivated catalyst composition comprising a medium or large pore shape-selective siliceous zeolite material having active internal Bronsted acid sites and containing a surface-inactivating amount of an organophosphorus base or cation, the base or cation having an effective cross section larger than the zeolite pore.

2. The catalyst composition of claim 1 wherein said zeolite material comprises aluminosilicate having a silica-to-alumina mole ratio of at least 12 and a constraint index of about 0.5 to 12 prior to phosphorus compound surface treatment.

8. A surface-inactivated catalyst composition comprising a zeolite having the structure of ZSM-5 and having active internal Bronsted acid sites and containing no metals other than periodic group IIIB or IVB elements and having an acid cracking value of greater than 50 and containing a surface-inactivating amount of an organophosphorus base or cation, said base or cation having an effective cross-section larger than a zeolite pore.

4,716,136

MACROSTRUCTURAL UNIT HAVING A CATALYTICALLY-ACTIVE ZEOLITE SURFACE

Paul B. Weisz, Yardley, and Tsoung Y. Yan, Philadelphia, both of Pa., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Dec. 20, 1985, Ser. No. 811,199
Int. Cl.[4] B01J 29/06
U.S. Cl. 502—64 9 Claims

1. A process for preparing a macrostructural unit having a catalytically-active zeolite surface as an integral part of the macrostructural unit, which comprises:

(a) mixing a slurry containing one or more of finely divided silica, silica gel, alumina, aluminum hydroxide and kaolin, said slurry having a ratio of silicon atoms to aluminum atoms corresponding to that of the zeolite to be formed, with plasticizer to form a plastic mass;

(b) shaping the plastic mass to a desired configuration;

(c) calcining the shaped plastic mass at 500° to 800° C. for 1 to 10 hours to form a rigid macrostructural unit having the same configuration as the shaped plastic mass;

(d) crystallizing 5 to 80% of the rigid macrostructural unit obtained by calcination to crystalline aluminosilicate zeolite; and,

(e) activating the crystalline aluminosilicate zeolite to catalytically-active zeolite.

4,716,137

PROCESS OF PREPARING A CATALYST CONTAINING ACTIVATED ISOMERIZATION SITES

Paul H. Lewis, Groves, Tex., assignor to Texaco Inc., White Plains, N.Y.

Division of Ser. No. 342,546, Jan. 25, 1982, Pat. No. 4,489,216. This application Sep. 19, 1984, Ser. No. 652,022
Int. Cl.[4] C07C 5/24
U.S. Cl. 502—74 12 Claims

1. The method which comprises

loading a hydrogen mordenite having a silica-to-alumina mole ratio of 10-20:1, with a metal of the platinum-palladium group thereby forming a loaded hydrogen mordenite;

calcining said loaded hydrogen mordenite at 1200° F.-1500° F. thereby forming a loaded calcined hydrogen mordenite containing activated isomerization sites; and

recovering said loaded calcined hydrogen mordenite containing activated isomerization sites.

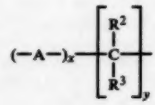
4,716,138

OLIGOMERIZATION TO ALPHA-OLEFINS

Rex E. Murray, Charleston, W. Va., assignor to Union Carbide Corporation, Danbury, Conn.

Division of Ser. No. 887,183, Jul. 21, 1986, Pat. No. 4,689,437. This application Dec. 12, 1986, Ser. No. 940,982
Int. Cl.[4] B01J 31/14, 31/02
U.S. Cl. 502—117 34 Claims

1. An oligomerization catalyst percursor comprising (i) a transition metal compound wherein the transition metal is selected from the group consisting of nickel, chromium, cobalt, iron, and copper, and mixtures thereof and (ii) at least one organophosphorus sulfonate ligand containing (a) at least one benzene ring having a trivalent phosphorus atom located at one position on the benzene ring and an SO_3M group located at a position on the benzene ring ortho thereto, or at least one benzene ring having a trivalent phosphorus atom connected through a methylene group to a first position on the benzene ring and an SO_3M group connected through a methylene group to a second position on the benzene ring ortho to the first position, or at least one bridging or fused aromatic ring system having a trivalent phosphorus atom and an SO_3M group, each located on the same or different aromatic ring in the system at substituent positions adjacent to one another, or at least one aromatic ring, other than a benzene ring, or heteroaromatic ring, each ring having a trivalent phosphorus atom and an SO_3M group located at substituent positions adjacent to one another, wherein M is selected from the group consisting of hydrogen, alkali metals, alkaline earth metals, and NR_4 and PR_4 wherein R is a hydrogen atom or a substituted or unsubstituted hydrocarbyl radical having 1 to 15 carbon atoms and each R can be alike or different or (b) a trivalent phosphorus atom connected through a group having the formula



to an SO_3M group wherein A is an oxygen atom, an NH radical, or an NR radical; R^2 and R^3 are hydrogen atoms or a substituted or unsubstituted hydrocarbyl radical h having 1 to 6 carbon atoms and can be alike or different; x is an integer 0 or 1; y is an integer from 1 to 3; and R and M are as defined above.

4,716,139

AMORPHOUS SULFIDE CATALYSTS OF TRIVALENT CHROMIUM AND PROMOTER METALS AND METHOD OF MAKING SAME

Allan J. Jacobson, Princeton; Teh C. Ho, Bridgewater; Russell R. Chianelli, Somerville; John J. Steger, Pittstown, and Angelo A. Montagna, Summit, all of N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Continuation of Ser. No. 656,144, Sep. 28, 1984, abandoned, which is a continuation-in-part of Ser. No. 567,882, Jan. 3, 1984, abandoned, which is a continuation of Ser. No. 454,384, Dec. 29, 1982, abandoned. This application Mar. 31, 1986, Ser. No. 846,219
Int. Cl.[4] B01J 31/00, 27/047, 27/049, 27/051
U.S. Cl. 502—167 13 Claims

1. A process for preparing a catalyst composition comprising an amorphous metal sulfide of trivalent chromium, (i) a metal selected from the group consiting of Mo, W and mixture thereof and (ii) at least one promoter metal selected from the group consisting of Fe, Ni, Co, Mn, Zn, Cu and mixtures thereof said proxess comprising heating one or more precursors at a temperature of at least about 200° C., under oxygen-free conditions and in the presence of sulfur for a time sufficient to form said catalyst, wherein said precursor is selected from the group consisting of $[Cr_{1-z}M_zLX_y][MoS_4]n$, $[Cr_{1-z}M_zLX_y][WS_4]_n$ and mixture thereof, wherein $n=(3-z-y)/2$, wherein M is one or more divalent promoter metals selected from the group consiting of Mn, Fe, Co, Ni, Cu, Zn and mixtures thereof, wherein $1>z\geq 0$ and $1-z\geq y\geq 0$, wherein L is one or more neutral nitrogen-containing ligands, at least one of which is a chelating polydentate ligand, and wherein X is a singly charged anionic ligand.

4,716,140

HYDROTREATING CATALYSTS PREPARED FROM HYDROGELS

Richard A. Kemp, Stafford, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Oct. 28, 1986, Ser. No. 924,092
Int. Cl.[4] B01J 27/19, 27/188, 27/18; C01F 7/02
U.S. Cl. 502—211 39 Claims

1. A process for preparing highly active hydrotreating catalysts having surface areas above about 300 m^2/g and at least about 80% of the pore volume in pores having diameters less than about 70 Å, which process comprises:

(a) precipitating an aqueous solution of one or more aluminum salt(s) in the presence of a phosphorus-containing compound by adjusting the pH of said solution to a range between about 5.5 and about 10.0 at a temperature in the range between about 20° C. and about 90° C.,

(b) aging the precipitate at a temperature ranging from about

20° C. to about 90° C. for at least about 15 minutes at a pH ranging from about 8.0 to about 12.0,

(c) washing the precipitate,

(d) mixing the precipitate with a solution containing solubilized salts of nickel and a heavy metal selected from the group consisting of molybdenum, tungsten and mixtures thereof, and a phosphorus-containing compound in an amount of from about 0.2 to about 1.5 moles of phosphorus per mole of heavy metal at a pH in the range between about 4.0 and about 8.0 and a temperature in the range between about 25° C. and about 100° C. until adsorption of the metal salts onto the gel is sufficient to yield a final catalyst having from about 1% w to about 5% w nickel and from about 8% w to about 32% w heavy metal,

(e) extruding the product of step (d), and

(f) drying and calcining the product of step (e) at a temperature ranging from about 300° C. to about 900° C.

4,716,141

HYDROTREATING CATALYSTS PREPARED FROM HYDROGELS

Richard A. Kemp, Stafford, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Oct. 28, 1986, Ser. No. 924,225

Int. Cl.[4] B01J *27/19, 27/188, 27/185;* **C10G** *45/08*

U.S. Cl. 502—211 **75 Claims**

1. A process for preparing highly active hydrotreating catalysts having surface areas above about 300 m^2/g and at least about 80% of the pore volume in pores having diameters less than about 70 Å, which process comprises:

(a) precipitating an aqueous solution of one or more aluminum salt(s) in the presence of a phosphorus-containing compound by adjusting the pH of said solution to a range between about 5.5 and about 10.0 at a temperature in the range between about 20° C. and about 90° C.,

(b) aging the precipitate at a temperature ranging from about 20° C. to about 90° C. for at least about 15 minutes at a pH ranging from about 8.0 to about 12.0,

(c) washing the precipitate,

(d) mixing the precipitate with dry, water-soluble salts of nickel and a heavy metal selected from the group consisting of molybdenum, tungsten, and mixtures thereof and a phosphoruscontaining compound in an amount of from about 0.2 to about 1.5 moles of phosphorus per mole of heavy metal, at a pH in the range between about 4.0 and about 8.0 and a temperature in the range between about 25° C. and about 100° C. to yield a final catalyst having from about 1% w to about 5% w nickel and from about 8% w to about 32% w heavy metal,

(e) extruding the product of step (d), and

(f) drying and calcining the product of step (e) at a temperature ranging from about 300° C. to about 900° C.

4,716,142

CATALYSTS FOR THE HYDRODENITROGENATION OF ORGANIC MATERIALS AND PROCESS FOR THE PREPARATION OF THE CATALYSTS

Richard M. Laine, Palo Alto; Albert S. Hirschon, Menlo Park, and Robert B. Wilson, Jr., Mountain View, all of Calif., assignors to SRI International, Menlo Park, Calif.

Filed Aug. 26, 1986, Ser. No. 900,447

Int. Cl.[4] B01J *21/04, 27/049, 27/051*

U.S. Cl. 502—220 **47 Claims**

1. A process for the preparation of a multimetallic catalyst for the hydrodenitrogenation of an organic feedstock, which process comprises:

(a) forming a precatalyst itself comprising: (i) a first metal compound selected from compounds of nickel, cobalt or mixtures thereof; (ii) a second metal compound selected from compounds of chromium, molybdenum, tungsten, or mixtures thereof; and (iii) an inorganic support;

(b) heating the precatalyst of step (a) with a source of sulfide in a first non-oxidizing gas at a temperature and for a time effective to presulfide the precatalyst;

(c) adding in a second non-oxidizing gas to the sulfided precatalyst of step (b) an organometallic transition metal moiety selected from compounds of iridium, rhodium, iron, ruthenium, tungsten or mixtures thereof for a time and at a temperature effective to chemically combine the metal components; and

(d) optionally heating the chemically combined catalyst of step (b) in vacuum at a temperature and for a time effective to remove residual volatile organic materials.

4,716,143

DEHYDROGENATION CATALYST COMPOSITION

Tamotsu Imai, Mt. Prospect, Ill., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 871,356, Jun. 6, 1986, abandoned. This application Feb. 25, 1987, Ser. No. 18,541

Int. Cl.[4] G01J *21/04, 23/58, 23/62*

U.S. Cl. 502—326 **10 Claims**

1. A catalytic composite comprising a platinum group metal component, a modifier metal component selected from the group consisting of a tin component, germanium component, rhenium component, and mixtures thereof on a refractory oxide support having a nominal diameter of at least about 850 microns wherein the platinum group component and the modified metal component are surface-impregnated such that the average concentration of the surface-impregnated platinum group component and modifier metal component on the outside 100 micron layer of the catalyst particle are each at least 2 times the concentration of the respective platinum group component and modifier metal component in the 200 micron diameter center core of the catalyst.

4,716,144

DYE-BARRIER AND SUBBING LAYER FOR DYE-DONOR ELEMENT USED IN THERMAL DYE TRANSFER

Noel R. Vanier, Rochester; Kin K. Lum, Webster, and Wayne A. Bowman, Walworth, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 813,294, Dec. 24, 1985, abandoned. This application Nov. 25, 1986, Ser. No. 934,969

Int. Cl.[4] B41M *5/26*

U.S. Cl. 503—227 **20 Claims**

9. In a process of forming a dye transfer image comprising imagewise-heating a dye-donor element comprising a support having on one side thereof a dye layer and on the opposite side thereof a slipping layer comprising a lubricating material and transferring a dye image to a dye-receiving element to form said dye transfer image, the improvement wherein a hydrophilic dye-barrier layer is located between said dye layer and said support, and a subbing layer is located between said dye-barrier layer and said support.

4,716,145

NON-IMAGEWISE REHEATING OF TRANSFERRED DYES IN THERMAL DYE TRANSFER ELEMENTS

Noel R. Vanier, Rochester; Gary W. Byers, and Helmut Weber, both of Webster, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jun. 27, 1986, Ser. No. 879,690

Int. Cl.[4] B41M *5/26*

U.S. Cl. 503—227 **17 Claims**

7. In a process of forming a stable dye transfer image comprising imagewise-heating a dye-donor element comprising a support having thereon at least one continuous area comprising a layer of an image dye dispersed in a binder, and transferring a dye image to a dye-receiving element to form said dye transfer image, said imagewise-heating being done by a thermal print head, the improvement comprising heating said dye-receiving element containing said transferred dye image

with said thermal print head while a continuous area of said dye-donor element that does not contain any image dye is located between said thermal print head and said dye-receiving element containing said transferred image dye, so that stratification of said transferred image dye in said dye-receiving element is reduced.

4,716,146

4-ALKYLPHENYL-2-ALKOXYETHYL ETHERS AND FRAGRANCE COMPOSITIONS CONTAINING SAME

Eugene G. Harris, West Chester, Ohio, assignor to National Distillers and Chemical Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 636,772, Aug. 1, 1984, abandoned. This application Dec. 19, 1986, Ser. No. 944,143

Int. Cl.[4] A61K *7/46;* **C11B** *9/00;* **C07C** *43/20*

U.S. Cl. 512—21 **6 Claims**

1. A compound having the structural formula:

wherein R and R^1 are lower alkyl having from 1 to 2 carbon atoms.

4,716,147

SYNTHETIC AIRIAL PEPTIDES

Foe S. Tjoeng, Manchester; Kam F. Fok, St. Louis, and Steven P. Adams, St. Charles, all of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Mar. 27, 1986, Ser. No. 844,906

Int. Cl.[4] A61K *37/02;* **C07K** *7/10, 7/08*

U.S. Cl. 514—11 **16 Claims**

1. A synthetic peptide having potent natriuretic activity comprising the following amino acid sequence:

R_1-cys-phe-gly-gly-arg-X-asp-arg-ile-gly-ala-gln-ser-gly-leu-gly-cys-asn-R_2

wherein

R_1=arg, arg-arg, leu-arg-arg, ser-leu-arg-arg, D-arg, D-arg-D-arg,

R_2=ser-phe, ser-phe-arg, ser-phe-arg-tyr,

X=met, ile,

or the physiologically acceptable salts, esters or amides thereof.

4,716,148

PROTHYMOSIN ALPHA

Bernard L. Horecker, New York, N.Y., assignor to Hoffman-La Roche Inc., Nutley, N.J.

Division of Ser. No. 639,757, Aug. 13, 1984, Pat. No. 4,659,694, which is a continuation-in-part of Ser. No. 546,211, Oct. 27, 1983, abandoned. This application Nov. 18, 1986, Ser. No. 932,074

Int. Cl.[4] A61K *37/02*

U.S. Cl. 514—12 **4 Claims**

1. A method for reconstituting immune functions in thymic deprived or immunodeprived warm-blooded mammals which method comprises administering to such mammal an immunopotentiating effective amount of a substantially homogeneous peptide and the pharmaceutically acceptable acid and base addition salts thereof, wherein said peptide comprises about 113 amino acid residues; wherein the isoelectric focusing point of said peptide is about 3.55; wherein about one half of the amino acid residues in said peptide consist of glutamic acid and aspartic acid; wherein said peptide does not contain methionine, cysteine or aromatic amino acids; wherein said peptide has the amino acid sequence starting from the amino terminal end:

1 10
Ser—Asp—Ala—Ala—Val—Asp—Thr—Ser—Ser—Glu—

20
—Ile—Thr—Thr—Lys—Asp—Leu—Lys—Glu—Lys—Lys—

30
—Glu—Val—Val—Glu—Glu—Ala—Glu—Asn—Gly—Arg—

40
—Asp—Ala—Pro—Ala—Asn—Gly—Asn—Ala—Glu—Asn—

50
—Glu—Glu—Asn—Gly—Glu—Gln—Glu—Ala—Asp—Asn—

60
—Glu—Val—Asp—Glu—Glu—Glu—Glu—Glu—Gly—Gly—

70
—Gly—Glu—Glu—Asx—Gly—Gly—Glx—Glx—Glx—Glx—

80
—Glx—Glx—Glx—Glx—Glx—Glx—Asn—Gly—Asp—Glu—

90
—Asp—Glu—Glu—Ala—Glu—Ala—Pro—Thr—Gly—Lys—

100
—Arg—Val—Ala—Glu—Asp—Asp—Glu—Asp—Asp—Asp—

110
—Val—Glu—Thr—Lys—Lys—Gln—Lys—Lys—Thr—Asp—

—Glu—Asp—Asp—.

4,716,149

PARTIALLY MODIFIED, RETRO-INVERSO NEUROTENSIN ANALOGS

Fabio Bonelli; Antonello Pessi, both of Rome, and Antonio S. Verdini, Monterotondo, all of Italy, assignors to Enichem S.p.A. and Eniricerche S.p.A., both of Milan, Italy

Filed Dec. 13, 1985, Ser. No. 808,617

Claims priority, application Italy, Dec. 21, 1984, 24197 A/84

Int. Cl.[4] A61K *37/02;* **C07K** *7/08*

U.S. Cl. 514—13 **7 Claims**

1. A neurotensin-like peptide, partially retro-inverted at the Ile—Leu bond, of the general formula (I):

Glp—Leu—Tyr—Glu—Asn—Lys—Pro—Arg—Arg— (I)

—Pro—Tyr—NH—CH—NH—CO—CH—COOH
(with R^1 under the first CH and R^2 under the second CH)

wherein R^1 and R^2 are straight or branched alkyl radicals of from 1 to 7 carbon atoms.

4,716,150

SYNTHETIC PEPTIDES AND USE THEREOF IN PREPARING CALMODULIN ANTISERA

Linda J. Van Eldik, and D. Martin Watterson, both of Nashville, Tenn., assignors to Vanderbilt University, Nashville, Tenn. and The Rockefeller University, New York, N.Y.

Continuation of Ser. No. 597,243, Apr. 5, 1984, abandoned. This application Aug. 26, 1985, Ser. No. 770,227

Int. Cl.[4] H61K *37/02;* **C07K** *7/08, 7/06*

U.S. Cl. 514—14 **50 Claims**

1. A synthetic peptide immunogen for use in developing antisera against vertebrate calmodulin, the peptides having a chain length of from 8 to 15 amino acids arranged in a linear N-terminal to C-terminal sequence which includes the immunogenic heptapeptide segment asparagine-tyrosine-glutamic acid-glutamic acid-phenylalanine-valine-glutamine, said pep-

tide immunogen being selected from the class of peptides consisting of:

(a) Gly-Gln-Val-Asn-Tyr-Glu-Glu-Phe-Val-Gln-Met-Met-Thr-Ala-Lys;
(b) Gly-Gln-Val-Asn-Tyr-Glu-Glu-Phe-Val Gln-Met-Met-The-Ala;
(c) Gly-Gln-Val-Asn-Tyr-Glu-Glu-Phe-Val-Gln-Met-Met-Thr;
(d) Gly-Gln-Val-Asn-Tyr-Glu-Glu-Phe-Val-Gln-Met-Met;
(e) Gly-Gln-Val-Asn-Tyr-Glu-Glu-Phe-Val-Gln-Met;
(f) Gly-Gln-Val-Asn-Tyr-Glu-Glu-Phe-Val-Gln;
(g) Gln-Val-Asn-Tyr-Glu-Glu-Phe-Val-Gln-Met-Met-Thr-Ala-Lys;
(h) Gln-Val-Asn-Tyr-Glu-Glu-Phe-Val-Gln-Met-Met-Thr-Ala;
(i) Gln-Val-Asn-Tyr-Glu-Glu-Phe-Val-Gln-Met-Met-Thr;
(j) Gln-Val-Asn-Tyr-Glu-Glu-Phe-Val-Glu-Met-Met;
(k) Gln-Val-Asn-Tyr-Glu-Glu-Phe-Val-Gln-Met;
(l) Gln-Val-Asn-Tyr-Glu-Glu-Phe-Val-Gln;
(m) Val-Asn-Tyr-Glu-Glu-Phe-Val-Gln-Met-Met-Thr-Ala-Lys;
(n) Val-Asn-Tyr-Glu-Glu-Phe-Val-Gln-Met-Met-Thr-Ala;
(o) Val-Asn-Tyr-Glu-Glu-Phe-Val-Gln-Met-Met-Thr;
(p) Val-Asn-Tyr-Glu-Glu-Phe-Val-Gln-Met-Met;
(q) Val-Asn-Tyr-Glu-Glu-Phe-Val-Gln-Met;
(r) Val-Asn-Tyr-Glu-Glu-Phe-Val-Gln;
(s) Asn-Tyr-Glu-Glu-Phe-Val-Gal-Met-Met-Thr-Ala-Lys;
(t) Asn-Tyr-Glu-Glu-Phe-Val-Gln-Met-Met-Thr-Ala;
(u) Asn-Tyr-Glu-Glu-Phe-Val-Gln-Met-Met-Thr;
(v) Asn-Tyr-Glu-Glu-Phe-Val-Gln-Met-Met;
(w) Ans-Tyr-Glu-Glu-Phe-Val-Gln-Met;

wherein, optionally, cysteine may also be present at either the N-terminal or C-terminal ends of said compounds (a) to (w), and wherein the abreviations Gly, Gln, Val Asn, Tyr, Glu, Phe, Met, Thr, Ala, and Lys represent respectively glycine, glutamine, valine, asparagine, tyrosine, glutamic acid, phenylalanine, methionine, threonine, alanine, and lysine.

4,716,151

TRIPEPTIDES AND THEIR USE

Pierre Jolles, Paris; Daniele Migliore-Samour, Le Kremlin-Bicetre, and Fabienne Parker, St Maur-des-Fosses, all of France, assignors to Rhone-Poulenc Sante, Courbevoie, France

Filed Aug. 14, 1985, Ser. No. 765,536
Claims priority, application France, Aug. 16, 1984, 84 12853
Int. Cl.[4] A61K *37/02;* **C07K** *5/08*
U.S. Cl. 514—18 **4 Claims**

1. A pharmaceutical composition having immunostimulant activity comprising an effective amount of a tripeptide selected from the group consisting of Gly-Leu-Phe, Gly-Leu-Tyr and Gly-Phe-Leu in combination with one or more diluents or adjuvants which are compatible and pharmaceutically acceptable.

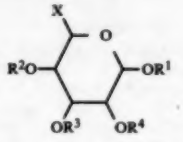
4,716,152

PHARMACEUTICAL USE OF SUBSTITUTED O-ACYLGLYCOSIDES

Bernd-Wieland Krüger, Wuppertal; Oswald Lockhoff, Cologne; Karl G. Metzger, Wuppertal, all of Fed. Rep. of Germany; Hans-Georg Opitz, Emeryville, Calif.; Klaus Schaller; Klaus G. Stünkel, both of Wuppertal, Fed. Rep. of Germany, and Hans-Joachim Zeiler, Velbert, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Nov. 28, 1984, Ser. No. 675,808
Claims priority, application Fed. Rep. of Germany, Dec. 7, 1983, 3344256
Int. Cl.[4] A61K *31/70*
U.S. Cl. 514—25 **13 Claims**

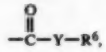
1. A method of activating the immune system of a patient which comprises administering to a patient an amount effective therefor of a compound of the formula



in which

X is hydrogen or the radical CH_2OR^5,

R^2, R^3, R^4 and R^5 each independently is hydrogen or the radical



Y is oxygen, sulphur, NH or CH_2, and

R^1 and R^6 each independently is a hydrocarbon radical having up to 50 carbon atoms, or a hydrocarbon radical having up to 50 carbon atoms wherein up to 5 methylene or methine groups are replaced by O, S, NH, N—C_{1-20}-alkyl or N—CO—C_{1-20}-alkyl, with the proviso that at least one of the radicals R^1 and R^6 contains between 9 to 50 carbon atoms.

4,716,153

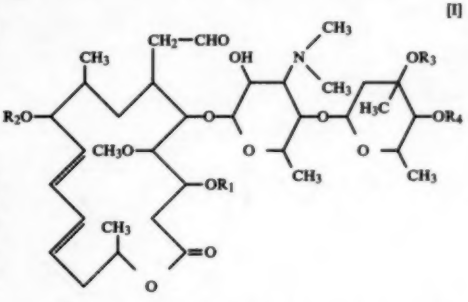
STABLE ORAL PREPARATION OF MACROLIDE ANTIBIOTICS AND METHOD FOR STABILIZING THE SAME

Masataka Morishita; Masaru Ono, and Yukio Sumita, all of Shizuoka, Japan, assignors to Toyo Jozo Company, Ltd., Shizuoka, Japan

Continuation of Ser. No. 555,378, Nov. 28, 1983, abandoned. This application Aug. 25, 1986, Ser. No. 900,231
Claims priority, application Japan, Dec. 4, 1982, 57-212942
Int. Cl.[4] A61K *31/70, 31/19, 37/44, 35/00*
U.S. Cl. 514—30 **18 Claims**

1. A stable oral preparation of a 16-membered ring macrolide antibiotic with increased resistance to dissolution by gastric juices and adequate bioavailability which comprises a 9-hydroxy or 9-acyloxy 16-membered ring macrolide and an effective amount of a stabilizer therefor, said stabilizer exhibiting a pH of 3–65 in aqueous solution and being present in an amount of at least 10 mg per 100 mg potency of said antiobiotic, said antibiotic having the formula

[I]



wherein each of R_1, R_2 and R_3 independent of the other is hydrogen or lower alkanoyl, and R_4 is lower alkanoyl, and said stabilizer being selected from the group consisting of neutral amino acids monosodium or monopotassum salt of acidic amino acids, basic amino acids, sodium or potassium salts of

mono-basic and polybasic organic carboxylic acids, calcium phosphate, aluminum glycinate and mixtures thereof.

4,716,154

GEL OF CROSSLINKED HYALURONIC ACID FOR USE AS A VITREOUS HUMOR SUBSTITUTE

Tomas Millson, and Bengt L. Lindqvist, both of Uppsala, Sweden, assignors to Pharmacia AB, Uppsala, Sweden

PCT No. PCT/SE85/00239, § 371 Date Dec. 3, 1985, § 102(e) Date Dec. 3, 1985, PCT Pub. No. WO86/00079, PCT Pub. Date Jan. 3, 1986

PCT Filed Jun. 7, 1985, Ser. No. 844,388

Claims priority, application Sweden, Jun. 8, 1984, 8403090

Int. Cl.[4] A61K *31/70*

U.S. Cl. 514—54 **16 Claims**

1. In the retinal surgery method in which a viscous fluid is introduced into an intraocular space enclosed between a rear boundary formed by the retina and a frontal boundry normally formed by the lens and the ciliary body, so that the pressure applied on the receptor layer by the viscous fluid, conjointly with any remaining portions of natural humor, will cause the receptor layer to lie in contact with the pigment epithelial layer for a period of time sufficient for healing, the improvement comprising that said viscous fluid contains a sterile and pyrogen-free gel of cross-linked hyaluronic acid.

4,716,155

PHOSPHORUS CONTAINING COMPOUNDS AND HYPOTENSIVE USE THEREOF

Donald S. Karanewsky, Princeton Junction, and Edward W. Petrillo, Jr., Pennington, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

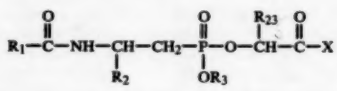
Division of Ser. No. 334,271, Dec. 24, 1981, Pat. No. 4,555,506. This application Jan. 25, 1985, Ser. No. 695,136

The portion of the term of this patent subsequent to Nov. 26, 2002, has been disclaimed.

Int. Cl.[4] C07F *9/58, 9/56*; A61K *31/40, 31/44*

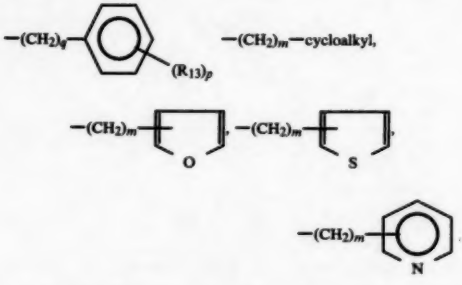
U.S. Cl. 514—89 **9 Claims**

1. A compound of the formula



and a pharmaceutically acceptable salt thereof wherein:

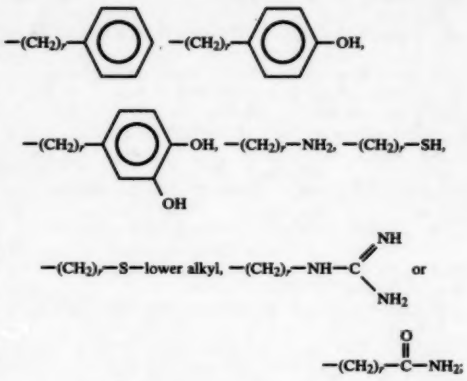
R_1 and R_2 are independently selected from the group consisting of hydrogen, lower alkyl, halo substituted lower alkyl,



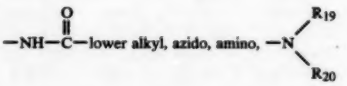
and amino substituted lower alkyl;

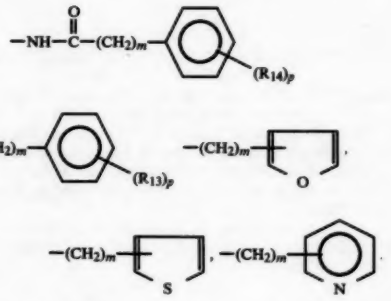
q is zero or an integer from 1 to 7;

R_{23} is hydrogen, lower alkyl, halo substituted lower alkyl,

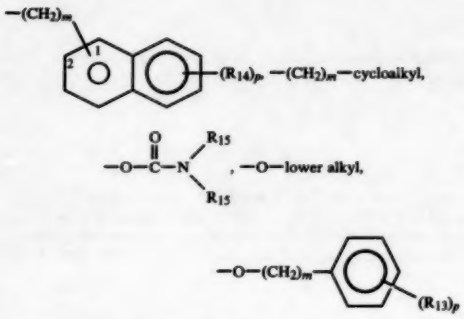


R_7 is hydrogen, lower alkyl, halogen, keto, hydroxy,

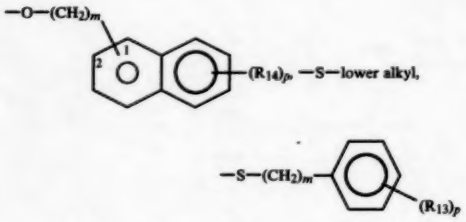




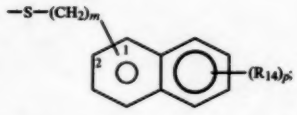
a 1- or 2-naphthyl of the formula



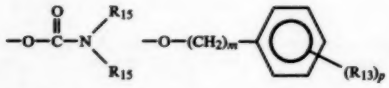
a 1- or 2-naphthyloxy of the formula



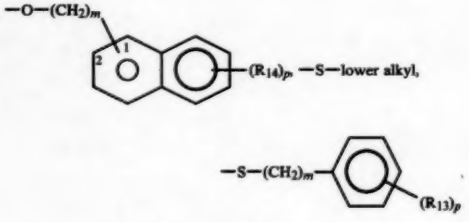
or a 1- or 2-naphthylthio of the formula



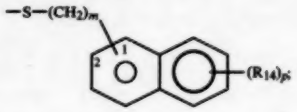
R_8 is keto, halogen,



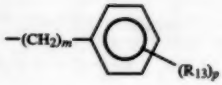
—O—lower alkyl, a 1- or 2-naphthyloxy of the formula



or a 1- or 2-naphthylthio of the formula



R_9 is keto or



R_{10} is halogen or —Y—R_{16};

R_{13} is hydrogen, lower alkyl of 1 to 4 carbons, lower alkoxy or 1 to 4 carbons, lower alkylthio of 1 to 4 carbons, chloro, bromo, fluoro, trifluoromethy;, hydroxy, phenyl, phenoxy, phenylthio, or phenylmethyl;

R_{14} is hydrogen, lower alkyl of 1 to 4 carbons, lower alkoxy of 1 to 4 carbons, lower alkylthio of 1 to 4 carbons, chloro, bromo, fluoro, trifluoromethyl, or hydroxy;

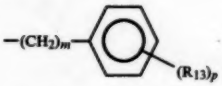
m is zero, one, two or three;

p is one, two or three provided that p is more than one only if R_{13} or R_{14} is hydrogen, methyl, methoxy, chloro or fluoro;

R_{15} is hydrogen or lower alkyl of 1 to 4 carbons;

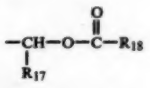
Y is oxygen or sulfur;

R_{16} is lower alkyl of 1 to 4 carbons or



r is an integer from 1 to 4;

R_3 and R_6 are independently selected from the group consisting of hydrogen, lower alkyl, benzyl, benzhydryl, and

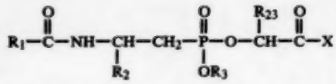


wherein R_{17} is hydrogen, lower alkyl, or phenyl, and R_{18} is hydrogen, lower alkyl, lower alkoxy, phenyl, or R_{17} and R_{18} taken together are —$(CH_2)_2$—, —$(CH_2)_3$—, —CH=CH—, or

R_{19} is lower alkyl, benzyl, or phenethyl; and

R_{20} is hydrogen, lower alkyl, benzyl or phenethyl.

8. A composition useful for treating hypertension comprising a pharmaceutically acceptable carrier and a hypotensive agent or pharmaceutically acceptable salt thereof of the formula



wherein R_1, R_2, R_3, R_{23}, and X are as defined in claim 1.

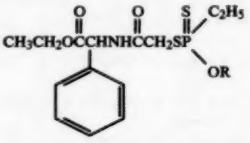
9. The method of alleviating hypertension in a mammalian species which comprises administering an effective amount of the composition of claim 8.

4,716,156
PHOSPHONODITHIOYLACETYL PHENYL AMINOACID ETHYL ESTERS

Llewellyn W. Fancher, New Castle, Calif., assignor to Stauffer Chemical Co., Westport, Conn.

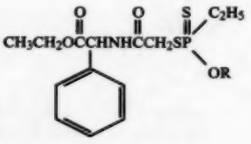
Filed Aug. 26, 1981, Ser. No. 296,286
Int. Cl.[4] A01N 57/02; C07F 9/40
U.S. Cl. 514—119 12 Claims

1. A method for controlling insects comprising applying to the insects, the habitat thereof, or a locus where protection is desired, an insecticidally effective amount of a compound having the formula



wherein R is lower alkyl having from 1 to 6 carbon atoms.

5. A compound having the structural formula



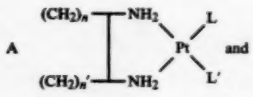
wherein R is lower alkyl having from 1 to 6 carbon atoms.

4,716,157
HETEROCYCLIC-1,2-DIAMINE PLATINUM COMPLEXES

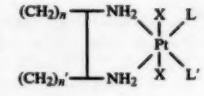
Panayota Bitha, Pomona; Ralph G. Child, Pearl River; Joseph J. Hlavka, Tuxedo Park, and Yang-I Lin, Nanuet, all of N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Filed Mar. 20, 1986, Ser. No. 841,647
Int. Cl.[4] C07F 15/00; A61K 31/555
U.S. Cl. 514—184 12 Claims

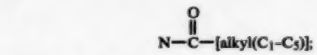
1. A compound selected from those of the formulae:



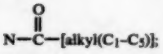
and



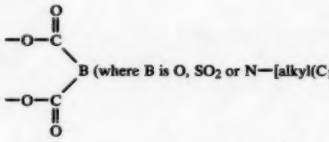
and

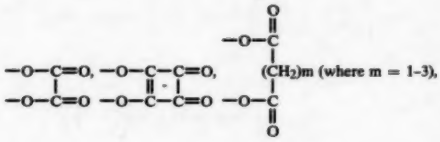


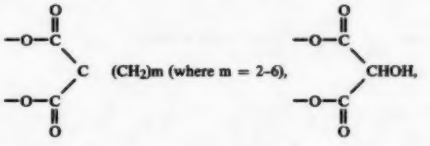
wherein A is selected from the group consisting of O, SO_2, N-[alkyl(C_1–C_5)]

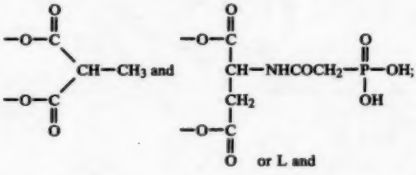


n and n′ are integers 1–3; L and L′ are selected from the group consisting of halide, nitrate, sulfate and an organic monobasic carboxylate; L and L′ taken together are ascorbate or a dibasic carboxylate selected from the group consisting of those of the formulae:

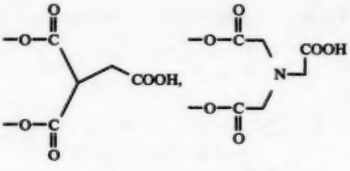


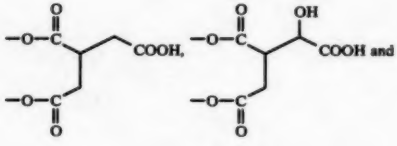






L′ taken together may be a tribasic carboxylate selected from the group consisting of those of the formulae:





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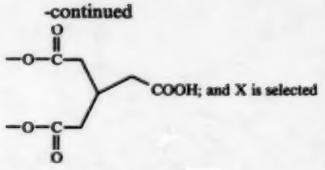


from the group consisting of halogen and hydroxy.

4,716,158

7-(2-AMINOTHIAZOL-4-YL)-2-(SYN)-METHOXYIMINOACETAMIDO)-3-METHOXYMETHYL-3-CEPHAM-4-CARBOXYLATES

Hideo Nakao; Koichi Fujimoto; Sadao Ishihara; Shinichi Sugawara, and Isamu Igarashi, all of Tokyo, Japan, assignors to Sankyo Company Limited, Tokyo, Japan

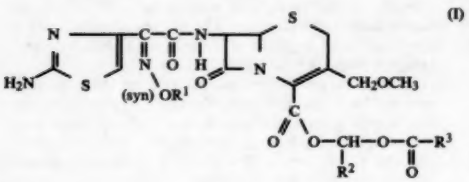
Continuation of Ser. No. 467,786, Feb. 18, 1983, abandoned, which is a division of Ser. No. 304,988, Sep. 23, 1981, Pat. No. 4,486,425. This application Jun. 10, 1986, Ser. No. 873,114

Claims priority, application Japan, Sep. 30, 1980, 55-136449; Apr. 13, 1981, 56-55231; Jun. 10, 1981, 56-89116

Int. Cl.[4] C07D *501/34;* A61K *31/545*

U.S. Cl. 514—202 **5 Claims**

1. Compounds of the formula (I):



wherein:

R^1 is a methyl group,

R^2 is a hydrogen atom or a methyl group, and

R^3 is a C_1–C_4 alkyl group; and

pharmaceutically acceptable acid addition salts thereof.

4,716,159

PYRIDAZINO[4,3-C]-ISOQUINOLINES HAVING ANTI-ANXIETY ACTIVITY

Emilio Toja, Milan, Italy, assignor to Gruppo Lepetit, S.p.A., Gerenzano, Italy

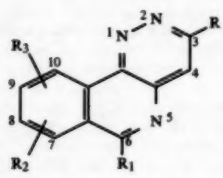
Continuation of Ser. No. 626,354, Jun. 29, 1984, abandoned. This application Jul. 30, 1986, Ser. No. 891,815

Claims priority, application Italy, Jul. 12, 1983, 22013 A/83

Int. Cl.[4] A61K *31/50;* C07D *471/04*

U.S. Cl. 514—210 **7 Claims**

1. Pyridazino[4,3-c]isoquinolines of Formula I



wherein R represents methyl, phenyl or substituted phenyl, wherein the phenyl ring is substituted with from 1 to 3 substituents selected from (C_1–C_4)alkyl, (C_1–C_4)alkoxy, halogen, phenyl and trifluoromethyl; R_1 represents hydrogen, chloro, a group of Formula —NR_4R_5 wherein R_4 and R_5, each independently, represent hydrogen, (C_1–C_4)alkyl, (C_2–C_4)alkenyl, (C_2–C_5)alkanoyloxymethyl, (C_1–C_4)alkoxycarbonyl, (C_1–C_4)alkyl substituted with one or two groups independently selected from hydroxy, (C_1–C_4)alkoxy, halogen, carboxy, cyano and aminocarbonyl, phenyl(C_1–C_4)alkyl or substituted phenyl-(C_1–C_4)alkyl wherein the alkyl portion may be substituted with one or two groups selected from hydroxy, (C_1–C_4)alkoxy, halogen, carboxy, (C_1–C_4)alkoxycarbonyl, and (C_2–C_4)alkanoyloxymethyl, and the phenyl portion may be substituted as defined, above, or R_4 and R_5 taken together with the adjacent nitrogen atom represent a saturated 4, 5, 6, or 7-membered heterocyclic ring which may contain a further heteroatom selected from oxygen and sulfur and optionally bear one or two substituents independently selected from (C_1–C_4)alkyl, phenyl, hydroxy, and carbo(C_1–C_4)alkoxy, or R_1 represents an alkoxy or cycloalkoxy group of Formula —OR_6 wherein R_6 stands for a (C_1–C_6)alkyl substituted with one or two groups independently selected from hydroxy, amino, mono- or di-(C_1–C_4)alkylamino, (C_1–C_4)alkoxy, halogen, oxo, carboxy, aminocarbonyl, mono- or di-(C_1–C_4)-alkylaminocarbonyl, and (C_1–C_4)alkoxycarbonyl, or R_6 is a (C_5–C_8)cycloalkyl group optionally substituted with at least one substituent selected from hydroxy and (C_1–C_4)alkoxy, R_2 and R_3 independently represent hydrogen, halogen, (C_1–C_4)alkyl or (C_1–C_4)alkoxy; and the pharmaceutically acceptable acid addition salts thereof.

7. A method of treating anxiety in a patient in need thereof which comprises administering to the patient an anti-anxiety effective amount of a compound of claim 1.

4,716,160

CERTAIN 7-AMINO-PYRAZOLO[4,3-B]PYRIDINES USEFUL IN TREATING INFLAMMATORY AND ALLERGIC DISORDERS

Roger E. Markwell, Great Dunmow; Robert W. Ward, Old Harlow, and Carol R. de Mello, North Mymms, all of England, assignors to Beecham Group p.l.c., Brentford, England

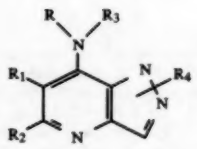
Filed Apr. 25, 1986, Ser. No. 856,454

Claims priority, application United Kingdom, Apr. 27, 1985, 8510774; Mar. 20, 1986, 8606885

Int. Cl.[4] A61K *31/44;* C07D *471/04*

U.S. Cl. 514—212 **8 Claims**

1. A compound of the formula (I) or a pharmaceutically acceptable salt or solvate thereof:



wherein:

R is hydrogen or C_{1-6} alkyl;

R_1 and R_2 are both hydrogen; or

R_1 is hydrogen, phenyl or C_{1-6} alkyl; and R_2 is CN, CR_5R_6Y where R_5 and R_6 are independently selected from hydrogen and C_{1-4} alkyl and Y is selected from hydrogen, or OR_7 or SR_7 where R_7 is hydrogen, C_{1-4} alkyl or C_{2-4} alkanoyl, and Y is also NR_8R_9 where R_8 and R_9 are independently hydrogen, C_{1-4} alkyl, C_{2-4} alkenyl or C_{2-4} alkanoyl or together are C_{4-6} polymethylene, or COR_{10} where R_{10} is OH, C_{1-4} alkyl, C_{1-6} alkoxy, C_{2-6} alkenyloxy, phenoxy or benzyloxy wherein the phenyl/benzyl moiety is optionally substituted by one or two of halogen, CF_3, C_{1-4} alkoxy and C_{1-4} alkyl; or R_{10} is $NR_{16}R_{17}$ wherein R_{16} and R_{17} are independently hydrogen, C_{2-6} alkyl, C_{2-6} alkenyl,

benzyl or phenyl optionally substituted as described above; or

R_2 is hydrogen, C_{1-6}alkyl, or phenyl optionally substituted by halogen, CF_3, C_{1-4} alkoxy or C_{1-4} alkyl; and R_1 is CN, CR_5R_6Y or COR_{10} as defined for R_2 above; or

R_1 and R_2 together form C_3–C_6 polymethylene optionally substituted by C_1–C_4 alkyl;

R_3 is selected from furyl, thienyl, pyrryl, benzofuranyl, benzothienyl, and indolyl optionally substituted by one or two substituents selected from halogen, CF_3, C_{1-4} alkoxy, C_{1-4} alkyl, hydroxy, nitro, cyano, C_{2-10} acyloxy, $NR_{11}R_{12}$ wherein R_{11} and R_{12} are independently selected from hydrogen, C_{1-6} alkyl, C_{2-7} alkanoyl or C_{1-6} alkylsulphonyl; or COR_{13} wherein R_{13} is hydroxy, C_{1-6} alkoxy or $NR_{14}R_{15}$ wherein R_{15} and R_{14} are independently selected from hydrogen or C_{1-6} alkyl; and

R_4 is hydrogen, or C_{1-4} alkyl, or benzyl optionally substituted in the phenyl ring by one or more of halogen, CF_3, C_{1-4} alkyl, and is attached at nitrogen atom 1 or 2.

7. A method of treatment or prophylaxis of inflammatory and/or allergic conditions in mammals including man which comprises the administration of an effective amount of a compound of formula (I) as claimed in claim 1 or a pharmaceutically acceptable salt or solvate thereof to the sufferer.

4,716,161

PHENYLPIPERAZINE DERIVATIVES AND THEIR ACID ADDITION SALTS

Harukazu Fukami, Kyoto; Ryoji Kikumoto, Machida; Kenichiro Nakao, Tokyo; Issei Nitta, Machida, and Shinya Inoue, Yokohama, all of Japan, assignors to Mitsubishi Chemical Industries Limited, Tokyo, Japan

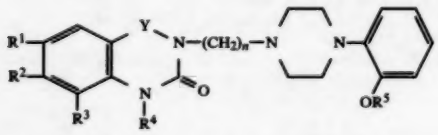
Filed Apr. 3, 1985, Ser. No. 719,456

Claims priority, application Japan, Apr. 17, 1984, 59-77006; Sep. 28, 1984, 59-203743; Oct. 5, 1984, 59-209133; Jan. 8, 1985, 60-1246

Int. Cl.[4] A61K *31/54;* **C07D** *417/06*

U.S. Cl. 514—222 **16 Claims**

7. A pharmaceutical composition for treating hypertension comprising an effective amount of a phenylpiperazine compound of the formula:



wherein R^1 and R^2 are each independently an alkoxy group of 1 to 3 carbon atoms, or R^1 and R^2 together with carbon atoms to which they are attached form $—O(CH_2)_mO—$ wherein m is an integer of 1 to 3; R^3 and R^4 are each hydrogen; Y is —CO—; R^5 is hydrogen or an alkyl group of 1 to 3 carbon atoms; and n is an integer of 2 to 4; or an acid addition salt thereof.

4,716,162

FUSED 5 RING HETEROCYCLIC COMPOUNDS, THEIR PREPARATION, AND THEIR ANTI-ARRHYTHMIC AND DIURETIC USE

Kuniyuki Tomita; Yasuo Shimoji; Seiji Kumakura; Hiroyuki Koike; Nobuyoshi Iwata, and Yasuhiro Morisawa, all of Hiromachi, Japan, assignors to Sankyo Company, Limited, Tokyo, Japan

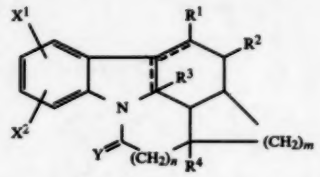
Filed Jul. 16, 1985, Ser. No. 755,474

Claims priority, application Japan, Jul. 18, 1984, 59-148766

Int. Cl.[4] A61K *27/00, 31/495;* **C07D** *401/14, 471/04*

U.S. Cl. 514—234 **30 Claims**

1. A compound of formula (I):



(I)

in which:

the dotted lines represent one single carbon-carbon bond and one double carbon-carbon bond or two single carbon-carbon bonds;

m is an integer from 2 to 7;

n is an integer from 1 to 3;

Y represents 2 hydrogen atoms or an oxo group;

R^1 represents a hydrogen atom or a C_1–C_6 alkyl group;

R^2 represents a hydrogen atom, a carboxy group, a group of formula $—NHCOOR^b$ in which R^b represents a C_1–C_6 alkyl group, a substituted C_1–C_6 alkyl group, an aralkyl group wherein the aryl part is C_6–C_{10} carbocyclic aryl and the alkyl part is C_1–C_6 alkyl, a substituted aralkyl group wherein the aryl part is C_6–C_{10} carbocyclic aryl and the alkyl part is C_1–C_6 alkyl, a C_3–C_6 alkenyl group, a C_3–C_6 haloalkenyl group, a C_3–C_{10} cycloalkyl group or a substituted C_3–C_{10} cycloalkyl group, a group of formula $—NR_2$, a quaternary ammonium group of formula $—N^+(R')_3$, a group of formula $—CONR_2$, a group of formula $—NHNR_2$, a group of formula $—NHCONR_2$, an aminoalkanoylamino group wherein the alkanoyl part is C_2–C_7 alkanoyl, a group of formula $—CO.NH.NR_2$ or a group of formula —CO.NH.N=CHR";

the two atoms or groups represented by R are independently selected from the group consisting of hydrogen atoms, C_1–C_6 alkyl groups, substituted C_1–C_6 alkyl groups, aralkyl groups where the aryl part is C_6–C_{10} carbocyclic aryl and the alkyl part is C_1–C_6 alkyl, substituted aralkyl groups where the aryl part is C_6–C_{10} carbocyclic aryl and the alkyl part is C_1–C_6 alkyl, heterocyclic groups and substituted heterocyclic groups; or the two symbols R, together with the nitrogen atom to which they are attached, represent a nitrogenous heterocyclic group;

the three groups represented by R' are independently selected from the group consisting of C_1–C_6 alkyl groups, substituted C_1–C_6 alkyl groups, aralkyl groups where the aryl part is C_6–C_{10} carbocyclic aryl and the alkyl part is C_1–C_6 alkyl and substituted aralkyl groups where the aryl part is C_6–C_{10} carbocyclic aryl and the alkyl part is C_1–C_6 alkyl;

R" represents a C_1–C_5 alkyl group or a phenyl group;

R^3 represents a hydrogen atom, a C_1–C_3 alkyl group or a substituted C_1–C_3 alkyl group;

R^4 represents a hydrogen atom, a C_1–C_6 alkyl group, a C_3–C_6 alkenyl group, a C_3–C_6 alkynyl group, an aralkyl group wherein the aryl part is a C_6–C_{10} carbocyclic aryl group and the alkyl part is C_1–C_6 alkyl, or the phenyl group;

X^1 and X^2 are independently selected from the group consisting of hydrogen atoms, C_1–C_6 alkyl groups, substituted C_1–C_6 alkyl groups, C_1–C_6 alkoxy groups, aralkyloxy groups wherein the aryl part is a C_6–C_{10} carbocyclic aryl group and the alkyl part is a C_1–C_6 alkyl group, hydroxy groups, halogen atoms, trifluoromethyl groups, nitro groups, amino groups, aminoalkanoylamino groups wherein the alkanoyl part is C_2–C_7 alkanoyl, mono- and di-alkylaminoalkanoylamino groups wherein the alkanoyl part is C_2–C_7 alkanoyl and the or each alkyl part is C_1–C_6 alkyl and is substituted or unsubstituted, C_2–C_7 alkanoyloxy groups, carboxy groups, carbamoyl groups, mono- and di-alkylcarbamoyl groups where the or each alkyl part is C_1–C_6 alkyl and cyano groups;

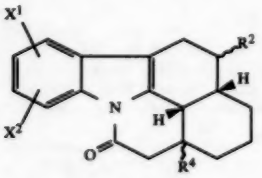
the substituents on said alkyl, cycloalkyl, alkoxy, aralkyl and heterocyclic groups are from 1 to 2 substituents selected from the group consisting of halogen atoms, cyano groups, nitro groups, hydroxy groups, C_1–C_4 alkoxy groups, mercapto groups, C_1–C_4 alkylthio groups, C_1–C_6 alkanoyl groups, carboxy groups, alkoxycarbonyl groups where the alkoxy part is C_1–C_4 alkoxy, amino groups, C_1–C_4 alkylamino groups, dialkylamino groups where each alkyl part is C_1–C_4 alkyl, carbamoyl groups, alkylcarbamoyl groups where the alkyl part is C_1–C_4 alkyl, dialkylcarbamoyl groups where each alkyl part is C_1–C_4 alkyl, and, only as substituents on substituted alkyl and alkoxy groups, C_3–C_{10} cycloalkyl groups, substituted C_3–C_{10} cycloalkyl groups, heterocyclic groups and substituted heterocyclic groups, and, only as substituents on cycloalkyl groups and substituted aryl parts of aralkyl groups, C_1–C_4 alkyl groups and substituted C_1–C_4 alkyl groups, and, only as substituents on substituted heterocyclic groups, C_1–C_4 alkyl groups, substituted C_1–C_4 alkyl groups, C_6–C_{10} carbocyclic aryl groups, substituted C_6–C_{10} carbocyclic aryl groups, arylalkenoyl groups wherein the aryl part is C_6–C_{10} carbocyclic aryl and the alkenoyl part is C_3–C_6 alkenoyl and substituted arylalkenoyl wherein the aryl part is substituted C_6–C_6 carbocyclic aryl and the alkenoyl part is C_3–C_6 alkenoyl;

said heterocyclic groups being selected from the group consisting of pyrrolidinyl, morpholinyl, piperidinoyl and piperazinyl;

said nitrogenous heterocyclic group being selected from the group consisting of: N-(2-cyclohexylethyl)carbamoyl, N-[2-(1-pyrrolidinyl)ethyl]carbamoyl, N-(2-piperidinoethyl)carbamoyl, N-(2-morpholinoethyl)carbamoyl, N-(3-morpholinopropyl)carbamoyl, N-(4-morpholinobutyl)-carbamoyl, N-[2-(4-methyl-1-piperazinyl)ethyl]carbamoyl, N-[2-(4-phenyl-1-piperazinyl)ethyl]carbamoyl, N-[2-(4-ethoxycarbonyl-1-piperazinyl)ethyl]carbamoyl, N-benzylcarbamoyl, N-4-methylbenzylcarbamoyl, N-2-chlorobenzylcarbamoyl, N-4-chlorobenzylcarbamoyl, N-2-methoxybenzylcarbamoyl, N-4-methoxybenzylcarbamoyl, N-3,4-dimethoxybenzylcarbamoyl, N-phenethylcarbamoyl, N-4-methylphenethylcarbamoyl, N-4-chlorophenethylcarbamoyl, N-4-methoxyphenethylcarbamoyl, N-3,4-dimethoxyphenethylcarbamoyl, N-3,4,5-trimethoxyphenethylcarbamoyl, N-3-phenylpropylcarbamoyl, N-4-phenylbutylcarbamoyl, N-furfurylcarbamoyl, N-(2-pyridylmethyl)carbamoyl, N-(4-pyridylmethyl)carbamoyl, N-(2-pyrid-2-ylethyl)carbamoyl, N-cyclopentylcarbamoyl, N-cyclohexylcarbamoyl, N-phenylcarbamoyl, N-4-tolylcarbamoyl, N-4-chlorophenylcarbamoyl, N-4-methoxyphenylcarbamoyl, N-2-pyridylcarbamoyl, N-2-furylcarbamoyl, N-morpholinocarbamoyl, N-piperidinocarbamoyl and N-piperazinylcarbamoyl groups; and heterocyclic-carbonyl groups, selected from the group consisting of 1-pyrrolidinylcarbonyl, piperidinocarbonyl, 4-methyl-1-piperazinylcarbonyl and 4-phenyl-1-piperazinylcarbonyl groups,

or a pharmaceutically acceptable salt or ester thereof.

19. A compound of formula (I-5):



(I-5)

wherein

X^1 is 6—OH or 7—OH;

X^2 is H;

R^2 is NH_2 and

R^4 is H or C_1–C_6 alkyl.

4,716,163

HYPOGLYCEMIC METHOD USING 5-SUBSTITUTED PYRROLIDINYLIDENE COMPOUNDS

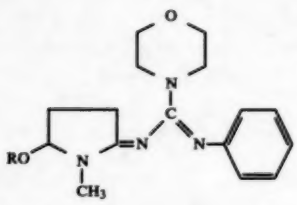
Joyce E. Epps, Jeffersonville; Kung-Tat Ng, Telford; Robert W. Tuman, Chalfont, and Wu-Nan Wu, Landsdale, all of Pa., assignors to McNeilab, Inc., Spring House, Pa.

Division of Ser. No. 902,348, Aug. 29, 1986, Pat. No. 4,670,436. This application Apr. 3, 1987, Ser. No. 33,948

Int. Cl.[4] A61K *31/535*

U.S. Cl. 514—237 **2 Claims**

1. A method for the treatment of diabetes which comprises administering to a mammal in need thereof, a pharmaceutical composition which comprises a pyrrolidinylidene of the following formula (I)



(I)

wherein

R is hydrogen, and the pharmaceutically acceptable acid addition salts thereof in combination with a pharmaceutically acceptable diluent or carrier.

4,716,164

AS-TRIAZINONES

Rodney B. Hargreaves, Poynton; Bernard J. McLoughlin, and Stuart D. Mills, both of Macclesfield, all of United Kingdom, assignors to Imperial Chemical Industries PLC, London, England

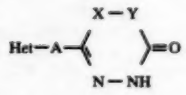
Division of Ser. No. 660,102, Oct. 12, 1984, Pat. No. 4,558,045, which is a division of Ser. No. 438,728, Nov. 3, 1982, Pat. No. 4,489,073. This application Oct. 31, 1985, Ser. No. 793,264

Claims priority, application United Kingdom, Nov. 12, 1981, 8134174

Int. Cl.[4] C07D *253/06, 401/04, 401/06;* **A61K** *31/53*

U.S. Cl. 514—242 **8 Claims**

1. A heterocyclic compound of the formula:



wherein A is a direct link, or is alkylene of 1 to 4 carbon atoms or alkenylene of 2 to 4 carbon atoms; wherein X is $—CR^1R^2—$ and Y is $—NR^3—$, wherein R^1 and R^2 are hydrogen and R^3 is hydrogen or alkyl of up to 4 carbon atoms; and wherein Het is 2-, 3- or 4-pyridyl which is unsubstituted or bears a chloro, bromo, cyano, carbamoyl or methyl substituent;

or Het is 2- or 3- thienyl which is unsubstituted or which bears one or two chloro or methyl substituents;

or Het is unsubstituted benzy[b]thienyl, benzo[b]furyl, indolyl or quinolyl;

or Het is 3-methyl-2-quinoxalinyl.

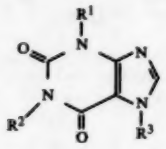
8. A method for the treatment of acute or chronic heart failure, or of hypertension, in a warm-blooded animal in need of such treatment, which comprises administering to said animal an effective amount of a heterocyclic compound claimed in claim **1**.

4,716,165
HISTAMINE H_1 ANTAGONISTS

Magid A. Abou-Gharbia, Brandywood, and Susan T. Nielsen, Wilmington, both of Del., assignors to American Home Products Corporation, New York, N.Y.

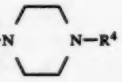
Filed Sep. 24, 1986, Ser. No. 910,906
Int. Cl.[4] C07D *473/08*; A61K *31/52*
U.S. Cl. 514—265 **9 Claims**

1. A compound of the formula:

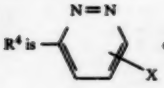
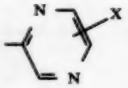


in which

R^1 is hydrogen or alkyl of 1 to 6 carbon atoms;

one of R^2 and R^3 is $-(CH_2)_n-N$ 

and the other is hydrogen or alkyl of 1 to 6 carbon atoms, where

R^4 is  or 

in which X is hydrogen, alkyl of 1 to 6 carbon atoms, alkoxy of 1 to 6 carbon atoms, halo, cyano or a nitro substituent on one of the available carbon atoms; and

n is one of the integers 2, 3 or 4;

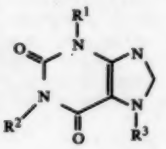
or a pharmaceutically acceptable salt thereof.

4,716,166
HISTAMINE H1 ANTAGONISTS

Magid A. Abou-Gharbia; Susan T. Nielsen, both of Wilmington, Del., and Michael B. Webb, King of Prussia, Pa., assignors to American Home Products Corporation, New York, N.Y.

Filed Oct. 21, 1986, Ser. No. 921,553
Int. Cl.[4] C07D *473/08*; A61K *31/52*
U.S. Cl. 514—265 **8 Claims**

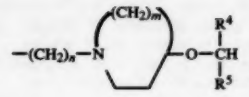
1. A compound of the formula:



in which

R^1 is hydrogen or alkyl of 1 to 6 carbon atoms;

one of R^2 and R^3 is alkyl of 1 to 6 carbon atoms and the other is



where

R^4 is pyridin-2-yl, pyridin-4-yl, thienyl, or phenyl, any of which is optionally substituted by a halo, alkyl of 1 to 6 carbon atoms, nitro, trifluoromethyl, hydroxy or alkoxy of 1 to 6 carbon atoms substituent;

R^5 is pyridin-2-yl, pyridin-4-yl or phenyl, any of which is optionally substituted by a halo, alkyl of 1 to 6 carbon atoms, hydroxy, alkoxy of 1 to 6 carbon atoms, nitro or trifluoromethyl substituent;

n is one of the integers from 2 to 10;

and m is one of the integers 1, 2 or 3,

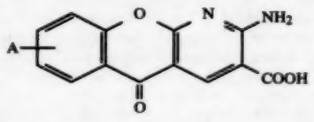
or a pharmaceutically acceptable salt thereof.

4,716,167
2-AMINO-5-OXO-5H-[1]BENZOPYRANO[2,3-B]PYRIDINE-3-CARBOXYLIC ACID DERIVATIVES

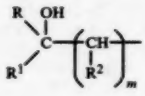
Akira Nohara, Kyoto, Japan, assignor to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Jan. 28, 1986, Ser. No. 823,479
Claims priority, application Japan, Jan. 28, 1985, 60-15109; Mar. 20, 1985, 60-56909
Int. Cl.[4] C07D *491/052*
U.S. Cl. 514—291 **9 Claims**

1. A compound of the formula:



wherein A is



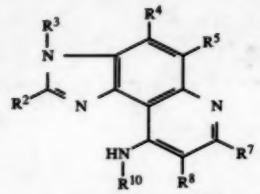
(R, R^1 and R^2 are independently hydrogen or lower alkyl and m is 0 or 1, with the proviso that when m is 1, R^1 is hydrogen) or R—CO— (R has the same meaning as defined above), or a physiologically acceptable salt thereof.

4,716,168
IMIDAZO(4,5-f)QUINOLINES USEFUL AS IMMUNOMODULATING AGENTS

Robert J. Alaimo, and Jon A. Andersen, both of Norwich, N.Y., assignors to Norwich Eaton Pharmaceuticals, Inc., Norwich, N.Y.

Continuation of Ser. No. 689,628, Jan. 8, 1985, abandoned. This application Apr. 29, 1986, Ser. No. 858,093
Int. Cl.[4] A61K *31/415*; C07D *471/04*
U.S. Cl. 514—293 **21 Claims**

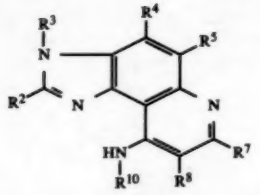
1. A compound of the class of imidazo[4,5-f]-quinolines which conform to the chemical structure or tautomeric structures thereof:



(I)

wherein R^2 is H, straight or branched chain lower alkyl, phenyl, substituted phenyl, furyl, thienyl, thiazoyl, or trihalomethyl; R^3 is H or straight or branched chain lower alkyl; R^4 and R^5 are H or straight or branched chain lower alkyl, or R^4 and R^5 are connected lower alkylene derivatives; R^7 is H, straight or branched chain lower alkyl, phenyl, substituted phenyl, furyl, thienyl, thiazoyl, (lower)alkoxycarbonyl, or trihalomethy; R^8 is H, lower alkyl, or (lower)alkoxycarbonyl, or R^7 and R^8 may join together to form a six-membered ring; and R^{10} is H, straight or branched chain alkyl, cyclohexyl, methylene cyclohexyl, or unsubstituted or substituted phenyl, naphthyl, pyridyl, piperidyl, or phenylalkyl; and wherein further said substituted phenyl groups are substituted, independently, with one or more groups selected from the group consisting of halo, nitro, cyano, hydroxy, C_1–C_{20} straight or branched chain alkyl, cyclohexyl, C_1–C_{20} straight or branched chain alkoxy, phenyl, trifluoromethyl, phenyloxy, benzyloxy, methylene-cyclohexyloxy, cyclopentyloxy, phenylazo, piperidyl, morpholinyl, pyrrolidyl, N-methyl piperazinyl, N-benzyl piperazinyl, carboxylic acid, carboxylic acid ethyl ester, methylthio, benzoyl, acetyl, propionyl, 2-diethylamino-ethoxy, and mono- or disubstituted amines substituted with H, lower alkyl, hydroxyalkyl, and alkanoyl; except said compounds wherein R^2 is H or methyl or unsubstituted phenyl and $R^3=R^4=R^5=R^8=H$ and R^7 is H or methyl or ethyl or unsubstituted phenyl and R^{10} is unsubstituted or substituted phenyl or 2-(4-methyl-1-piperazinyl)-5-pyridyl or 2-methoxy-5-pyridyl or 2-piperidino-5-pyridyl or 4-methoxybenzyl or cyclohexyl or α- or β-naphthyl; and salts and hydrates thereof.

13. A method for enhancing the immune response system of a mammal which comprises systematically administering to a mammal having a depressed immune function a pharmaceutical composition comprising a compound conforming to the following chemical structure or tautomeric structures thereof:



(I)

wherein R^2 is H, straight or branched chain lower alkyl, phenyl, substituted phenyl, furyl, thienyl, thiazoyl, or trihalomethyl; R^3 is H or straight or branched chain lower alkyl; R^4 and R^5 are H or straight or branched chain lower alkyl, or R^4 and R^5 are connected lower alkylene derivatives; R^7 is H, straight or branched chain lower alkyl, phenyl, substituted phenyl, furyl, thienyl, thiazoyl, (lower)alkoxycarbonyl, or trihalomethyl; R^8 is H, lower alkyl, or (lower)alkoxycarbonyl, or R^7 and R^8 may join together to form a six-membered ring; and R^{10} is H, straight or branched chain alkyl, cyclohexyl, methylene cyclohexyl, or unsubstituted or substituted phenyl, naphthyl, pyridyl, piperidyl, or phenylalkyl; and salts and hydrates thereof; and wherein further said substituted phenyl groups are substituted, independently, with one or more groups selected from the groups consisting of halo, nitro, cyano, hydroxy, C_1–C_{20} straight or branched chain alkyl, cyclohexyl, C_1–C_{20} straight or branched chain alkoxy, phenyl, trifluoromethyl, phenyloxy, benzyloxy, methylene-cyclohexyloxy, cyclopentyloxy, phenylazo, piperidyl, morpholinyl, pyrrolidyl, N-methyl piperazinyl, N-benzyl piperazinyl, carboxylic acid, carboxylic acid ethyl ester, methylthio, benzoyl, acetyl, propionyl, 2-diethylamino-ethoxy, and mono- or disubstituted amines substituted with H, lower alkyl, hydroxyalkyl, and alkanoyl; said pharmaceutical composition being administered to said mammal in an amount which is non-toxic but which is effective to enhance the function of the immune response system of said mammal.

4,716,169

IMIDAZO[1,2A]PYRIDINES AND THEIR USE AS CARDIOTONIC AGENTS

Joachim Heider, Warthausen; Norbert Hauel; Volkhard Austel, both of Biberach; Klaus Noll, Warthausen; Andreas Bomhard, Biberach; Jacques van Meel, Biberach, and Willi Diederen, Biberach, all of Fed. Rep. of Germany, assignors to Dr. Karl Thomae GmbH, Biberach an der Riss, Fed. Rep. of Germany

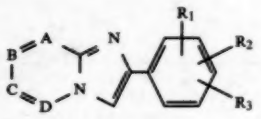
Filed Dec. 17, 1985, Ser. No. 810,008

Claims priority, application Fed. Rep. of Germany, Dec. 21, 1984, 3446778

Int. Cl.[4] **A61K** *31/41*; **C07D** *471/04*

U.S. Cl. 514—299 **8 Claims**

1. An imidazo[1,2-a]pyridine of the formula



(I)

wherein

one of the groups A, B, C or D is a —CH= group optionally substituted by a halogen atom or by an alkylmercapto, alkylsulphonyloxy, amino, alkylamino, dialkylamino or acetamido group;

another of the groups A, B, C or D is a —CH= group optionally substituted by an alkylmercapto group; and,

the other groups A, B, C or D are —CH= groups;

R_1 and R_2 together with two carbon atoms of the phenyl ring between them form a phenyl ring optionally substituted by an alkoxy group; and, when R_1 and R_2 do form such a phenyl ring,

R_3 is a hydrogen atom, a hydroxy, alkoxy or alkylsulphonyloxy group; or,

R_1 a phenylalkoxy, alkylsulphonyloxy, alkylsulphonamido, N-alkyl-alkylsulphonamido, aminosulphonyl, alkylaminosulphonyl or dialkylaminosulphonyl group or in the 4 position an acetamido, aminocarbonyl, alkylaminocarbonyl or dialkylaminocarbonyl group, it being provided that if one or two of the groups A, B, C or D are one of the above-mentioned substituted —CH= groups, then R_1 may also represent an amino, hydroxy, methoxy or cyano group in the 4 position;

R_2 is a hydrogen atom, a hydroxy or alkoxy group; and,

R_3 is a hydrogen atom or an alkoxy group;

wherein in all the above-mentioned groups the alkyl part may contain one or two carbon atoms;

or, a pharmaceutically acceptable acid addition salt thereof.

7. A pharmaceutical composition for treating heart failure characterized by reduced cardiac output containing an effective positive inotropic amount of a compound of claim **1** together with a pharmaceutically acceptable carrier.

4,716,170
5-[1H-(5-MEMBERED-N-AROMATIC HETERYL)-1-yl]-1,6-NAPHTHYRIDIN-2(1H)-ONES AND THEIR CARDIOTONIC USE

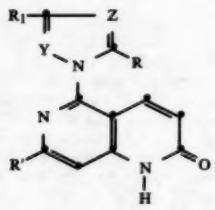
George Y. Lesher, Schodack, and Baldev Singh, East Greenbush, both of N.Y., assignors to Sterling Drug Inc., New York, N.Y.

Division of Ser. No. 816,591, Jan. 16, 1986, Pat. No. 4,634,772, which is a continuation-in-part of Ser. No. 811,040, Dec. 19, 1985, abandoned, which is a continuation-in-part of Ser. No. 765,900, Aug. 14, 1985, abandoned, which is a continuation-in-part of Ser. No. 695,603, Jan. 28, 1985, abandoned. This application Oct. 1, 1986, Ser. No. 913,910

Int. Cl.[4] A61K *31/44*; C07D *471/04*

U.S. Cl. 514—300 14 Claims

1. 5-[1H-(5-membered-N-aromatic heteryl)-1-yl]-7-R'-1,6-naphthyridin-2(1H)-one having the formula I



I

or pharmaceutically acceptable acid-addition or pharmaceutically acceptable cationic salt thereof, where R is hydrogen, halo or lower-alkyl, R' is hydrogen or methyl, R_1 is hydrogen, lower-alkyl, hydroxymethyl, halo, trifluoromethyl, nitro or phenyl, Z is N, C-H, C-(lower-alkyl), C-halo, C-hydroxymethyl or C-phenyl, and Y is N, C-H, C-halo, C-(lower-alkyl) or C-NO_2, at least one of Y or Z being N.

13. A method for increasing cardiac contractility in a patient requiring such treatment which comprises administering orally or parenterally in a solid or liquid dosage form to such patient a cardiotonically effective amount of 5-[1H-(5-membered-N-heteryl)-1-yl]-7-R'-1,6-naphthyridin-2(1H)-one of claim 1 or pharmaceutically acceptable acid-addition or cationic salt thereof.

4,716,171
ANTIARRHYTHMIC QUINIDINE DERIVATIVES

Francois-Xavier Jarreau, Versailles, and Jean-Jacques Koenig, Vernou la Celle s/Seine, both of France, assignors to Etablissements Nativelle S.A., France

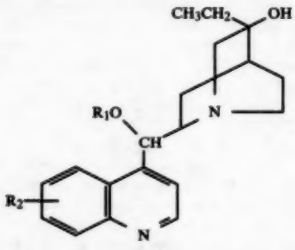
Continuation of Ser. No. 380,316, May 20, 1982, abandoned. This application Apr. 9, 1984, Ser. No. 597,219

Claims priority, application France, May 20, 1981, 81 10024

Int. Cl.[4] A61K *31/49*; C07D *453/04*

U.S. Cl. 514—305 13 Claims

1. A quinidine derivative of formula (I):



wherein R_1 represents a hydrogen atom, an alkyl group with 1 to 4 carbon atoms or an acyl group with 1 to 4 carbon atoms, and R_2 represents a hydroxy group, an alkoxy group with 1 to 4 carbon atoms, an acetoxy group, a formyloxy group or a benzoyloxy group or an acid addition salt thereof.

5. A pharmaceutical composition for the treatment of cardiac arrhythmias comprising a therapeutically effective amount of a derivative of claim 1, 2 or 3, or a pharmaceutically acceptable salt thereof and a pharmaceutically acceptable carrier or diluent.

4,716,172
4-SUBSTITUTED OCTAHYDROQUINOLIZINE ANALGESIC COMPOUNDS AND OCTAHYDROQUINOLIZINIUM INTERMEDIATES

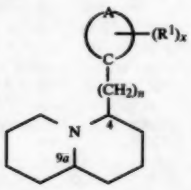
Richard J. Carmosin, Quakertown, and John R. Carson, Norristown, both of Pa., assignors to McNeilab, Inc., Spring House, Pa.

Filed Apr. 10, 1986, Ser. No. 850,631

Int. Cl.[4] A61K *31/345*; C07D *455/02*

U.S. Cl. 514—306 20 Claims

1. An octahydroquinolizine of the following formula (I)



(I)

wherein

A represents the atoms necessary to form a phenyl, naphthyl, cycloalkyl, or cycloalkenyl ring system as the A-C cycle shown in formula (I);

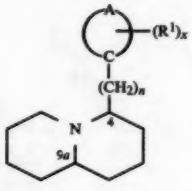
R^1 is independently cyano; halogen; alkyl; phenoxy; alkylthio; phenylthio; phenylthio substituted by acetamido, halo, or alkyl; haloalkyl; alkenyl; alkynyl or cycloalkenyl;

n is the integer 0; and

x is the integer 0, 1, 2, or 3, provided that when A is phenyl, x is 1, 2, or 3; and, when A is phenyl, x is 1, and R^1 is methoxy, R^1 is in the 2- or 3-position of the phenyl ring;

wherein said cycloalkyl and cycloalkenyl are of C_3–C_7 atoms and the alkyl portion of all the alkyl alkenyl and alkynyl containing groups are lower alkenyl alkenyl or alkyl; and the pharmaceutically-acceptable acid-addition salts thereof.

11. A pharmaceutical composition effective in the treatment of pain which comprises a pharmaceutically-acceptable carrier and a pain-reducing amount of an octahydroquinolizine of the following formula (I):



(I)

wherein

A represents the atoms necessary to form a phenyl, naphthyl, cycloalkyl, or cycloalkenyl ring system as the A-C cycle shown in formula (I);

R^1 is independently cyano; halogen; alkyl; phenoxy; alkylthio; phenylthio; phenylthio substituted by acetamido, halo, or alkyl; haloalkyl; alkenyl; alkynyl or cycloalkenyl;

n is the integer 0; and

x is the integer 0, 1, 2, or 3,

and the pharmaceutically-acceptable acid-addition salts thereof.

4,716,173

METHOD OF TREATMENT OF MALARIA BY ONE TIME INTERFERENCE

Aida Salatinjants, 1333 N. Hobart, Los Angeles, Calif. 90027

Filed Feb. 6, 1985, Ser. No. 698,837
Int. Cl.[4] A61K *31/47, 31/715, 31/525, 31/34*
U.S. Cl. 514—314 4 Claims

1. A composition adapted to prolong the residence time of drugs in the circulating plasma of mammals including humans comprising about 48 parts by weight potassium hydrogen tartrate, about 8 parts by weight tannic acid, about 94 parts by weight pectin, about 21 parts by weight L-tyrosine, about 6 parts by weight hexanoic acid, and about 200 parts by weight 10% riboflavin.

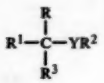
4,716,174

ARYL(ARYLOXY OR ARYLTHIO)AZOLOMETHANES AND THEIR USE AS PESTICIDES

Richard B. Rogers, Concord, and Maria P. Herrero, Berkeley, both of Calif., assignors to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 653,399, Sep. 24, 1984, Pat. No. 4,636,514, which is a continuation of Ser. No. 407,852, Aug. 13, 1982, abandoned. This application Aug. 18, 1986, Ser. No. 898,061
Int. Cl.[4] C07D *409/14;* A61K *31/38*
U.S. Cl. 514—340 4 Claims

1. A compound corresponding to the formula



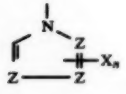
wherein

R represents hydrogen, phenyl or phenyl substituted independently with from 1 to 3 bromo, chloro, fluoro, iodo, C_1–C_4 alkyl, C_1–C_4 alkoxy, NO_2, CN or CF_3 groups;

R^1 represents thienyl or thienyl substituted independently with from 1 to 3 bromo, chloro, fluoro, iodo, C_1–C_4 alkyl, C_1–C_4 alkoxy, NO_2, CN or CF_3 groups;

R^2 represents pyridyl or pyridyl substituted independently with from 1 to 3 bromo, chloro, fluoro, iodo, C_1–C_4 alkyl, C_1–C_4 alkoxy, NO_2, CN or CF_3 groups;

R^3 represents a 5-membered N-heterocyclic ring of the formula



wherein

each Z independently represents —CH or N and at least one of Z is N;

X is C_1–C_4 alkyl, Br, Cl, F or I and

n represents an integer of from 0 to 3 and

Y is oxygen or sulfur.

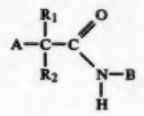
4,716,175

SATURATED FATTY ACID AMIDES AS INHIBITORS OF ACYL-COA:CHOLESTEROL ACYLTRANSFERASE

Milton L. Hoefle, Ann Arbor; Ann Holmes, Dexter, and Bruce D. Roth, Ann Arbor, all of Mich., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed Feb. 24, 1987, Ser. No. 17,960
Int. Cl.[4] A61K *31/44, 31/16, 31/165;* C07D *213/36;* C07C *103/19*
U.S. Cl. 514—357 7 Claims

1. A compound having the formula:



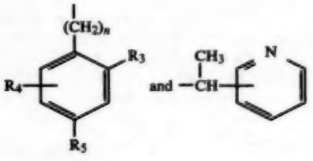
wherein A is an unbranched hydrocarbon group containing from one to twenty carbon atoms and which may contain from one to three carbon-carbon double bonds;

R_1 is hydrogen, alkyl of from one to four carbon atoms or phenylmethyl;

R_2 is alkyl of from one to four carbon atoms or phenylmethyl; or

R_1 and R_2 when taken together with the carbon atom to which they are attached form a saturated carbocyclic ring of from three to seven carbon atoms;

B is selected from



where n is zero or one,

R_3, R_4, and R_5 are independently selected from hydrogen, fluorine, chlorine, bromine, trifluromethyl, alkyl of from one to four carbon atoms, and alkoxy of from one to four carbon atoms;

6. A pharmaceutical composition useful for inhibiting the intestinal absorption of cholesterol comprising an ACAT-inhibitory effective amount of a compound as defined by claim 1 in combination with a pharmaceutically acceptable carrier.

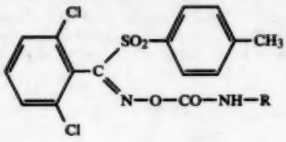
4,716,176

BENZALDOXIME CARBAMATE DERIVATIVES, THEIR COMPOSITIONS AND METHOD OF USE

Christa Fest, Wuppertal; Wilhelm Brandes, Leichlingen; Gerd Hänssler, and Paul Reinecke, both of Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed May 23, 1986, Ser. No. 867,101
Claims priority, application Fed. Rep. of Germany, Jun. 12, 1985, 3520943
Int. Cl.[4] A01N *47/12;* C07C *147/06, 131/00*
U.S. Cl. 514—477 14 Claims

1. A benzaldoxime carbamate of the formula



in which

R is alkyl having 1 to 6 carbon atoms, halogenoalkyl having 1 to 8 carbon atoms and 1 to 5 halogen atoms, cyanoalkyl having 1 to 6 carbon atoms in the alkyl part, tosyl, benzyl, cycloalkyl which has 5 to 7 carbon atoms and is optionally substituted by alkyl having 1 to 4 carbon atoms, or phenyl which is optionally substituted by substituents independently selected from the group consisting of alkyl having 1 to 6 carbon atoms, alkoxy having 1 to 4 carbon atoms, halogen, and halogenoalkoxy and halogenoalkyl each having 1 to 4 carbon atoms and 1 to 5 halogen atoms.

12. A fungicidal composition comprising a fungicidally effective amount of a compound according to claim 1 and a diluent.

4,716,177

TOLRESTAT FOR INHIBITION OF WEIGHT GAIN

Steven W. Ryder, St. James; David G. Shand, New York, and John F. Mullane, Pelham, all of N.Y., assignors to American Home Products Corporation, New York, N.Y.

Filed Apr. 17, 1986, Ser. No. 853,066
Int. Cl.[4] A61K *31/275*
U.S. Cl. 514—524 5 Claims

1. A method for inhibiting weight gain in a diabetic human in need of treatment for weight stabilization which comprises administering to the diabetic human an effective amount of tolrestat or a therapeutically acceptable salt thereof.

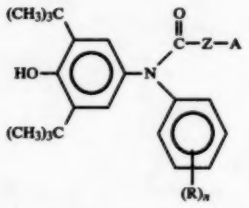
4,716,178

SUBSTITUTED DI-T-BUTYLPHENOLS

Robert A. Scherrer, White Bear, and Mark A. Rustad, Afton, both of Minn., assignors to Riker Laboratories, Inc., St.Paul, Minn.

Continuation-in-part of Ser. No. 876,287, Jun. 17, 1986, abandoned, which is a continuation of Ser. No. 757,454, Jul. 22, 1985, abandoned. This application Aug. 27, 1986, Ser. No. 879,472
Int. Cl.[4] A61K *31/195;* C07C *101/34*
U.S. Cl. 514—563 9 Claims

1. A compound of the formula



wherein each R independently represents hydrogen, lower alkyl, lower alkoxy, halogen, amino, lower alkylamino, di(-lower)alkylamino, hydroxy, lower acylamido, trifluoromethyl, benzoyloxy, carboxy, or a derivative of a compound wherein R is carboxy selected from a lower alkyl carboxylate ester, a (lower)alkylamino(lower)alkyl carboxylate ester, a pharmaceutically acceptable (lower)alkylamino(lower)alkyl ester acid-addition salt, and a pharmaceutically acceptable carboxylate salt; and n is 0, 1, 2 or 3, with the proviso that if n is 2 or 3, only one R substituent, at the most, is selected from carboxy, and further with the proviso that if n is 2 or 3, all R substituents combined contain no more than 6 carbon atoms; Z is a carbon-carbon bond, divalent alkyl of 1 to about 8 carbon atoms or divalent alkylene of 2 to about 8 carbon atoms, and when alkyl or alkylene, Z may optionally be substituted by methyl or phenyl and may contain an ether, thioether or phenylene linkage; A is selected from carboxyl, tetrazolyl, and N-methyl tetrazolyl, with the proviso that if Z is a carbon-carbon bond, A is carboxyl; or a derivative of the foregoing selected from a lower alkyl carboxylate ester, a (lower)alkylamino(lower)alkyl carboxylate ester, a pharmaceutically acceptable (lower)alkylamino(lower)alkyl carboxylate ester acid-addition salt and a pharmaceutically acceptable carboxylate salt of the carboxy moiety when A is carboxyl, and selected from a pharmaceutically acceptable alkali metal and an alkaline earth salt of the tetrazolyl moiety when A is tetrazolyl.

4,716,179

USE OF NON-IRRITATING OR SLIGHTLY IRRITATING AND/OR PROMOTING DITERPENE ALCOHOL AND OF DERIVATIVES THEREOF AS ANTINEOPLASTIC PREPARATIONS

Erich Hecker, Heidelberg-Handschuhsheim; Hans Osswald, and Rainer Schmidt, both of Heidelberg, all of Fed. Rep. of Germany, assignors to Stiftung Deutches Krebsforschungszentrum, Heidelberg, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 113,760, Jan. 21, 1980, abandoned. This application Feb. 29, 1984, Ser. No. 584,738
Claims priority, application Fed. Rep. of Germany, Jan. 23, 1979, 2902506
Int. Cl.[4] A61K *31/12*
U.S. Cl. 514—691 8 Claims

1. The method of treating transplanted tumor-afflicted animal subjects which comprises administering to said subjects an anti-transplanted tumor effective amount of phorbol, said phorbol being incorporated in a carrier material.

4,716,180

COMPOSITION AND METHOD FOR THE PRESERVATION OF MASTITIS

Walter Fetty, Lincoln, Nebr., and Joseph R. Killian, Akron, Ohio, assignors to Killian Latex, Inc., Akron, Ohio

Filed Nov. 16, 1984, Ser. No. 672,486
Int. Cl.[4] A01N *25/00*
U.S. Cl. 514—782 6 Claims

1. A liquid film-forming composition for the preventative treatment of mastitis in dairy animals by application thereof onto a teat, comprising in substantially the following weight ratios:

4162.50	wt.	natural rubber latex
500.00	wt.	propylene glycol
10.40	wt.	sulfur
4.20	wt.	sodium isopropyl xanthate
12.40	wt.	mercaptobenzothiazole
83.20	wt.	clay
30.00	wt.	tetrasodium salt of ethylenediamine tetraacetic acid
29.27	wt.	potassium hydroxide
16.50	wt.	sulfonated fatty acid
6.00	wt.	casein
8.04	wt.	wax
6.79	wt.	gum Arabic
6.53	wt.	ammonia
.81	wt.	oleic acid
11.64	wt.	parachloro meta-xylenol
1.68	wt.	sodium salt of alkyl sulfonic acid
.61	wt.	shellac
.61	wt.	alcohol
.32	wt.	triethanolamine
.32	wt.	sodium alkyl arylether sulfate
.21	wt.	caustic soda
.21	wt.	sodium o-phenylphenate tetrahydrate, and,

-continued

3119.89 wt.	water.

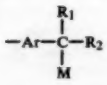
4,716,181

SCAVENGERS FOR THE REMOVAL OF IMPURITIES FROM ARSINE AND PHOSPHINE

Glenn M. Tom, Wilmington, Del., assignor to Hercules Incorporated, Wilmington, Del.

Division of Ser. No. 938,701, Dec. 5, 1986, which is a division of Ser. No. 888,180, Jul. 21, 1986, Pat. No. 4,659,552. This application May 7, 1987, Ser. No. 46,759
Int. Cl.[4] C08F *14/00*
U.S. Cl. 521—53 3 Claims

1. A process for preparing a macroreticulate polymer scavenger comprising reacting (1) a hydride selected from the group consisting of arsine and phosphine and (2) a metallated macroreticulate polymer having a plurality of pendant functional groups or mixtures of functional groups having the general formula:



where Ar is an aromatic hydrocarbon radical containing from one to three rings, R_1 and R_2 are the same or different and are selected from the group consisting of hydrogen and alkyl hydrocarbon radicals containing from 1 to 12 carbon atoms, and M is a metal selected from the group consisting of sodium, potassium and lithium, said metallated macroreticulate polymer having within its pores a compound selected from the group consisting of a 1–12 carbon alkyl compound of M and a hydride of M, or mixtures thereof.

4,716,182

COLD SETTING COMPOSITIONS, A PROCESS FOR THE PRODUCTION THEREOF AND THE USE THEREOF FOR POLYURETHANE PRODUCTION

Heinrich Hess; Gerhard Grögler, both of Leverkusen, and Richard Kopp, Cologne, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jul. 29, 1986, Ser. No. 891,725
Claims priority, application Fed. Rep. of Germany, Aug. 16, 1985, 3529251
Int. Cl.[4] C08G *18/14*
U.S. Cl. 521—163 16 Claims

1. A cold setting two-component composition comprising
(A) a suspension of
(i) a surface-modified, finely-divided
polyisocyanate, wherein from 0.1 to 25 equivalent percent of the isocyanate groups of the unmodified polyisocyanate have been deactivated, with
(ii) an aliphatic polyamine having a molecular weight of from 400 to 8000,
said suspension being storage stable up to 85° C., and
(B) member from the group consisting of
(i) polyhydroxyl compounds having molecular weights of from 62 to 8000,
(ii) water, and
(iii) mixtures thereof.

4,716,183

STYRENE-DIENE BLOCK COPOLYMER COMPOSITIONS

Jose P. Gamarra, Union City, and C. John Swinmurn, Los Altos, both of Calif., assignors to Raychem Corp., Menlo Park, Calif.

Filed Nov. 22, 1985, Ser. No. 801,018
Int. Cl.[4] C08K *5/01*
U.S. Cl. 522—80 10 Claims

1. A crosslinked composition comprising:
about 2 to about 30 parts by weight of a styrene-diene block copolymer;
about 70 to about 98 parts by weight hydrocarbon oil; and
about 0.5 to about 25% by weight based on the weight of the copolymer and oil of a multifunctional coupling agent; and
wherein the copolymer-oil-coupling agent composition is cross-linked with electron beam radiation or with UV radiation in the presence of a photoinitiator.

4,716,184

EPOXY RESIN ENCAPSULATING COMPOSITION WITH ENHANCED MOISTURE RESISTANCE AND METHOD FOR PRODUCING THE SAME

Hirohiko Kagawa; Yasuhiro Kyotani, and Munetomo Torii, all of Kadoma, Japan, assignors to Matsushita Electric Works, Ltd., Japan

Filed Dec. 3, 1986, Ser. No. 937,331
Int. Cl.[4] C08F *6/28*
U.S. Cl. 523—310 10 Claims

1. An epoxy resin encapsulating composition with enhanced moisture resistance for semiconductor packages consisting essentially of the admixture of an epoxy resin adduct of epichlorohydrin and an aromatic hydroxyl-containing compound, and an inorganic ion-exchange solid material, said ion-exchange solid material be-ing in the form of particles dispersed in the epoxy resin adduct and capable of exchanging its mobile anions with the chlorine ions which originate from the epichlorohydrin and occur in the epoxy resin adduct as a result of possible hydrolysis of the corresponding chlorides, said ion-exchange solid material being represented by the general formula:

$$SbBixOy(OH)z(NO_3)w.n(H_2O)$$

in which x represents 0.2 to 2.0, y represent 1.0 to 5.0, z represents 0.1 to 3.0, w represents 0.1 to 3.0 and n represents 0.5 to 3.0 and forming an ion-exchange network which carries said mobile anions to be substituted with said chlorine ions.

4,716,185

CURABLE MIXTURES BASED ON DIGLYCIDYL COMPOUNDS AND METAL COMPLEX COMPOUNDS

Claus W. Rabener, Oetlingen; Hans-Peter Hörner, Wehr, both of Fed. Rep. of Germany, and Dieter Baumann, Möhlin, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jan. 16, 1987, Ser. No. 3,969
Claims priority, application Switzerland, Jan. 17, 1986, 191/86-3; Nov. 19, 1986, 4616/86-7
Int. Cl.[4] C08G *59/68*
U.S. Cl. 523—456 17 Claims

1. A curable mixture, containing
(a) at least one bisphenol diglycidyl ether based on bisphenol a, hydrogenated bisphenol A or bisphenol F,
(b) as a curing catalyst, a colorless or slightly yellow solution of a metal complex compound of the formula I

$$[Me(H_2O)_x(Lm)_y]^{2+}\ (A^{\ominus})_2 \qquad (I),$$

in which
Me is a divalent metal from the group consisting of Zn, Cd, Sn, Pb, Ca or Mg,
Lm is a saturated cyclic ether having 5 to 7 ring atoms, a linear or cyclic saturated aliphatic ether compound or a mixture of the ether and the ether compound, the ether

and the ether compound having a boiling point of at least 60° C., and

A is an anion of the formula $BF_4^{\ominus}$, $PF_6^{\ominus}$, $AsF_6^{\ominus}$ or $SbF_6^{\ominus}$,

x is the number 4, 5 or 6 and y is zero or the number 1 or 2, the sum of x and y always being 6, the complex being dissolved in an excess of the corresponding ether or the corresponding ether compound,

(c) a sterically hindered mononuclear or polynuclear phenol, a phosphite of the formula II or III

(II)

or

(III)

in which R_1, R_2 and R_3 independently of one another are each phenyl, alkyl-substituted phenyl having 1–12 carbon atoms in the alkyl radical or alkyl having 1 to 20 carbon atoms, or a mixture of a sterically hindered mononuclear or polynuclear phenol and a phosphite of the formula II or III and, optionally,

(d) as a reactive diluent, up to 25 parts by weight, relative to 100 parts by weight of (a), of at least one diglycidyl ether of 1,4-butanediol, 1,6-hexanediol or neopentyl glycol or a cresol glycidyl ether and, optionally,

(e) as an adhesion promoter, an organic silane, titanate or zirconate.

4,716,186

STARCH DERIVATIVES AND METHODS OF MAKING USING SAME

Norman A. Portnoy, Decatur, and Larry P. Avery, Oreana, both of Ill., assignors to A. E. Staley Manufacturing Company, Decatur, Ill.

Filed Apr. 9, 1986, Ser. No. 849,930

Int. Cl.⁴ C08B *31/08, 33/04, 35/04*

U.S. Cl. 524—50 **13 Claims**

1. A cold water soluble carboxymethylated granular starch material having an average degree of carboxymethyl substitution in the range of from about 0.15 to about 1.0 of such substituent per anhydroglucose unit in the starch molecule and having a ratio of inorganic anion content, in weight percent on a starch material dry solids weight basis, to carboxymethyl degree of substitution of about 14 or less.

4,716,187

STABILIZING POLYMERS

Lajos Ávár, Biel-Benken, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

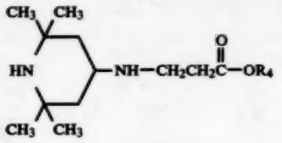
Continuation-in-part of Ser. No. 590,506, Mar. 16, 1984, abandoned. This application Mar. 15, 1985, Ser. No. 712,345

Claims priority, application Fed. Rep. of Germany, Mar. 21, 1983, 3310100

Int. Cl.⁴ C08K *5/34*

U.S. Cl. 524—99 **2 Claims**

1. A mixture of compounds of the formula



wherein R_4 is an isomer of the formula $—C_{12}H_{25}$.

4,716,188

WATER-REPELLENT AND VAPOR-PERMEABLE PAINT

Oskar Mariusson, Lindarflot 3, IS-210 Gardabae 3, and Jon Bjarnason, Safamyri 21, IS-108 Reykjavik, both of Iceland

Filed Jun. 6, 1986, Ser. No. 871,278

Claims priority, application Denmark, Jun. 11, 1985, 2596/85

Int. Cl.⁴ C08K *5/54, 3/34*

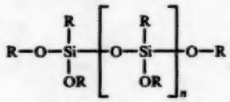
U.S. Cl. 524—268 **5 Claims**

1. A water-repellent and vapor-permeable paint, suitable for outdoor surfaces, concrete surfaces and surfaces in "wet" rooms indoors, said paint comprising one or more fillers selected from the group consisting of pigments and particulate extenders, a continuous phase consisting of at least one volatile organic solvent, at least one organic binder selected from the group consisting of acrylic and methacrylic resins, said binder also comprising at least one non-crosslinked oligomeric alkyl-substituted organosiloxane, wherein

(a) the paint has a pigment-volume concentration (PVC) within the range of 47 to 65%;

(b) the paint, as part of said filler, contains diatom shells in an amount of 3 to 10% of the paint including volatile solvents;

(c) one or more non-crosslinked oligomeric alkyl-alkoxy organosiloxanes are present as part of said continuous phase and having the general formula



wherein the group R, which may be identical or different, each denotes a C_{1-8} alkyl group and n is a number from 3 to 8, said oligomeric organosiloxane being present in an amount of 10 to 30% of the weight of binder excluding the oligomeric organosiloxane, said diatom shells having inner surfaces which have been rendered hydrophobic by said one or more non-crosslinked oligomeric alkyl-alkoxy organosiloxane.

4,716,189

COMPOSITION

Hans J. Gollub, Bühl; Dieter A. Hechenberger, Sinsheim, and Renate Moermann, Bühl, all of Fed. Rep. of Germany, assignors to Lingner & Fischer GmbH, Fed. Rep. of Germany

Filed Jan. 8, 1987, Ser. No. 1,378

Claims priority, application United Kingdom, Jan. 10, 1986, 8600599

Int. Cl.⁴ C08F *110/02*

U.S. Cl. 524—284 **9 Claims**

1. A stick for the application of adhesive material to a substrate, comprising an adhesive dissolved or dispersed in a liquid medium containing an alkali metal or ammonium salt of an aliphatic carboxylic acid having from 8 to 36 carbon atoms, characterised in that the adhesive comprises a mixture of (i) an aqueous dispersion of an optionally carboxylated (C_4 to C_{10})-alkyl ester of acrylic acid and (ii) an aqueous dispersion of polyethylene.

4,716,190

METHOD FOR EQUILIBRATING POLYAMIDE MAGNET WIRE COATINGS AND ENAMEL COMPOSITIONS

Francois A. Lavallee, Fort Wayne, Ind., assignor to Essex Group, Inc., Ft. Wayne, Ind.

Filed Dec. 22, 1986, Ser. No. 945,159
Int. Cl.[4] C08T 5/05
U.S. Cl. 524—386 8 Claims

1. A method for equilibrating a high molecular weight polyamide for use as a magnet wire enamel comprising:

forming a solution of a polyamide resin in an organic solvent;

adding an organic titanate titanium catalyst and a solvolytic agent containing at least one reactive hydrogen to said solution;

heating said solution to a sufficiently high temperature to cause a solvolytic reaction between the polyamide and solvolytic agent thereby resulting in the reduction of the polyamide to a lower average molecular weight and a lower viscosity.

4,716,191

CABLE FLOODING COMPOUND

Thomas D. Hindman; Thomas J. Roessing, both of Parker, and Joseph D. Burkhard, Petrolia, all of Pa., assignors to Witco Corp., New York, N.Y.

Filed May 16, 1985, Ser. No. 734,676
Int. Cl.[4] C08K 5/01; H02G 15/00
U.S. Cl. 524—488 4 Claims

1. A cable flooding compound comprising; 92–94 weight percent of a microcrystalline wax having a melting point of 170°–180° F. (ASTM D-127) and a penetration of 25–35 (ASTM D-1321), and an elastomeric polymer comprising, 3–5 weight percent of polyethylene and 2–4 weight percent of a rubber, and wherein the compound is a cable flooding compound exhibiting the jacket slip characteristics of atactic polypropylene.

4,716,192

STABLE EMULSIONS OF WATER RESISTANT POLYVINYL ALCOHOL-STABILIZED VINYL CHLORIDE-ETHYLENE COPOLYMERS

John G. Iacoviello, Allentown, Pa., assignor to Air Products and Chemicals, Inc., Allentown, Pa.

Division of Ser. No. 747,133, Jun. 20, 1985, Pat. No. 4,673,702, which is a continuation-in-part of Ser. No. 572,726, Jan. 20, 1984, abandoned. This application Mar. 13, 1987, Ser. No. 25,901
The portion of the term of this patent subsequent to Jun. 16, 2004, has been disclaimed.
Int. Cl.[4] C08F 2/16; C08K 3/20
U.S. Cl. 524—549 35 Claims

1. A method for preparing a stable vinyl chloride based resin emulsion which comprises a copolymer colloidally dispersed in an aqueous medium, the copolymer having a Tg from 0° to 50° C., about 65 to 90 wt % vinyl chloride, about 5 to 35 wt % ethylene, about 1 to less than about 5 wt % olefinically unsaturated copolymerizable monomer, provided that when the copolymerizable monomer is acrylamide about 1 wt % is present, and prepared by emulsion polymerization of vinyl chloride monomer, ethylene and the olefinically unsaturated comonomer in the presence an emulsifying system consisting essentially of about 3 to 15 wt % polyvinyl alcohol which is 70 to 91 mole % hydrolyzed, which method comprises

(a) forming an aqueous emulsion reaction mixture containing substantially all the polyvinyl alcohol and a portion of the total vinyl chloride monomer,

(b) pressurizing the reaction mixture with an ethylene pressure sufficient to provide the copolymer with a 5 to 35 wt % ethylene content,

(c) initiating the reaction mixture by the addition of a free radical generating source and continuing polymerization until the rate of poymerization begins to decrease,

(d) adding the remaining vinyl chloride over a period of time while continuing polymerization until the reaction is no longer self-sustaining, and

(e) removing the unreacted ethylene and reducing the vinyl chloride free monomer content of the emulsion.

4,716,193

REACTIVE GLASS COMPONENT IN RIM

Robert A. Grigsby, Jr., Georgetown, Tex., assignor to Texaco, Inc., White Plains, N.Y.

Filed Aug. 4, 1986, Ser. No. 892,237
Int. Cl.[4] C08G 18/00
U.S. Cl. 524—730 4 Claims

1. A reaction injection molded elastomer made by reacting in a closed mold ingredients comprising amine terminated polyethers of greater than 1500 average molecular weight, having greater than 50% of their active hydrogens in the form of amine hydrogens, a chain extender and an aromatic polyisocyanate having also present an additive comprising a filler and the silane compound octadecyltriethoxysilane.

4,716,194

REMOVABLE PRESSURE SENSITIVE ADHESIVE

James L. Walker, Whitehouse Station, and Paul B. Foreman, Somerville, both of N.J., assignors to National Starch and Chemical Corporation, Bridgewater, N.J.

Filed Nov. 25, 1985, Ser. No. 801,251
Int. Cl.[4] C08L 33/06, 43/04
U.S. Cl. 524—806 19 Claims

1. In an acrylate based pressure sensitive emulsion adhesive having a Tg of about −60° to about −20° C. the improvement which comprises polymerizing therein an effective amount of an organofunctional silane monomer thereby improving the removability of the adhesive.

4,716,195

PROCESS FOR THE PREPARATION IN MICROSUSPENSION OF A VINYL CHLORIDE POLYMER LATEX AND RESULTANT PRODUCTS

Daniel Brulet, Saint-Auban, France, assignor to Societe d'Extrusion et de Transformation, France

Filed Sep. 2, 1986, Ser. No. 903,023
Claims priority, application France, Sep. 6, 1985, 85 13267
Int. Cl.[4] C08L 27/06
U.S. Cl. 524—851 7 Claims

1. A process for the preparation of a vinyl chloride polymer latex having particles with a mean diameter between about 0.2 and 0.8 μm and containing at least one organosoluble polymerization initiator comprising:

a. dispersing in an aqueous reaction medium also containing parabenzoquinone, vinyl chloride or vinyl chloride and at least one monomer copolymerizable therewith, at least one anionic emulsifier, and from about 0.004 to 0.16% by weight, with respect to said monomers, of said initiator expressed in terms of active oxygen,

b. polymerizing at one at a desired polymerization temperature, θ_1, and

c. continuously adding parabenzoquinone to said aqueous reaction medium during the polymerization when the temperature θ_2 of the reaction medium is such that the difference $\theta_2-\theta_1$ exceeds a value from 0° to +5° C.

4,716,196

FLAME RETARDED THERMOPLASTIC STYRENIC COMPOSITIONS

Glenn B. Hilton, Enfield, Conn., and Wayne W. Robertson, Springfield, Mass., assignors to Monsanto Company, St. Louis, Mo.

Filed Oct. 1, 1984, Ser. No. 656,195
Int. Cl.[4] C08L 51/04, 71/04
U.S. Cl. 525—72 2 Claims

1. A flame retarded thermoplastic composition consisting essentially of, in intimate admixture:

(a) a copolymer of styrene and acrylonitrile grafted on a rubber substrate which is dispersed in a matrix copolymer of styrene and acrylonitrile;

(b) a flame retardant additive or mixture of such additives in an amount sufficient to impart flame retardant properties to said grafted and ungrafted copolymers; and

(c) polytetrafluoroethylene resin having a particle size within the range of about 70 to about 700 microns in an amount of between 0.05 and 0.15 weight percent based on the weight of (a), (b) and (c).

4,716,197

POLYETHYLENE/EPDM-GRAFT POLYSTYRENE BLENDS

Randolph H. Seiss, and Edward H. Yonkers, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Apr. 21, 1986, Ser. No. 854,281
Int. Cl.[4] C08L 23/06, 23/18, 25/04, 51/04
U.S. Cl. 525—75 21 Claims

1. A polymer blend comprising:

from about 20 to about 90% of a blend of high density polyethylene and a linear low density polyethylene, of which from about 15 to about 85% comprises said linear low density polyethylene;

from about 6 to about 60% of a vinyl aromatic polymer; and

from about 4 to about 20% of a vinyl aromatic grafted alpha-olefin copolymer compatibilizer for said vinyl aromatic polymer and said polyethylenes.

4,716,198

RESIN COMPOSITION

Katuyoshi Murabayashi, Sakai, Japan, assignor to Daicel Chemical Industries, Ltd., Osaka, Japan

Filed Jun. 11, 1985, Ser. No. 743,536
Claims priority, application Japan, Jun. 19, 1984, 59-124493
Int. Cl.[4] C08L 53/00
U.S. Cl. 525—92 13 Claims

1. A resin composition suitable for injection molding, comprising:

(1) 100 parts by weight of a thermoplastic injection moldable resin component consisting of

(a) a first thermoplastic injection moldable resin selected from the group consisting of polystyrene, copolymer of styrene and acrylonitrile and copolymer of acrylonitrile, butadiene and styrene and

(b) up to 50 percent by weight of a second thermoplastic injection moldable resin different from said first resin

and

(2) 0.01 to 50 parts by weight of a polyamide block copolymer consisting essentially of

(a) 10 to 90 percent by weight of polyamide blocks prepared by polymerizing amino carboxylic acids having 6 to 12 carbon atoms, lactams having 6 to 12 carbon atoms, nylon salts prepared from diamines having from 6 to 12 carbon atoms and dicarboxylic acids having from 6 to 12 carbon atoms, and the balance is

(b) polyester blocks or polyol blocks linked to said polyamide blocks by ester bonds wherein said second thermoplastic injection moldable resin is different from said polyamide block copolymer.

4,716,199

RESIN COMPOSITION AND ARTICLES FORMED THEREFROM

Roelof van der Meer, Bergen op Zoom, Netherlands, assignor to General Electric Company, Selkirk, N.Y.

Continuation of Ser. No. 586,916, Mar. 7, 1984, abandoned. This application May 23, 1986, Ser. No. 847,388
Claims priority, application Netherlands, Mar. 17, 1983, 8300956
Int. Cl.[4] C08L 53/00
U.S. Cl. 525--92 3 Claims

1. A thermoplastic resin composition having improved multiaxial impact strength comprising:

100 parts by weight of a resin composition comprising:

(a) a polyphenylene ether resin or copolymers thereof; and

(b) a styrene resin or copolymers thereof, the ratio of polyphenylene ether to polystyrene being between 1:20 and 4:1; and 1 to 35 parts by weight per 100 parts (a), (b), and (c) of

(c) an unsaturated diblock copolymer consisting essentially of 20 to 40 percent by weight of an alkenyl aromatic block and 60 to 80 percent by weight of a diene block, the alkenyl aromatic block having a molecular weight of about 10,000 to 100,000 and the diene block having a molecular weight of about 50,000 to 500,000.

4,716,200

ACRYLIC POLYESTER HIGH SOLIDS COATINGS

Wellington F. Berghoff, Beachwood, Ohio, assignor to The Glidden Company, Cleveland, Ohio

Filed Mar. 6, 1986, Ser. No. 836,744
Int. Cl.[4] C08L 63/00
U.S. Cl. 525—111 19 Claims

1. A high solids coating composition comprising on a polymer solids weight basis:

between 1.5% and 40% low molecular weight acrylic copolymer of copolymerized ethylenically unsaturated monomers comprising a hydroxylated monomer, a monocarboxylic acid monomer, an acrylic monomer, and other ethylenic monomer, said acrylic copolymer having a number average molecular weight between 500 and 2000, a hydroxyl number between 50 and 300, and an Acid No. less than about 30;

between 1.5% and 78.5% low molecular weight polyester polymer having a number average molecular weight between 250 and 2000, a hydroxyl number between 115 and 285, and an Acid No. less than about 15, said polyester produced by esterifying one mole of a non-ether aliphatic glycol with at least 0.1 mole of an aromatic dicarboxylic acid and at least 0.1 mole of an aliphatic saturated dicarboxylic acid having 1 to 8 carbon atoms where said glycol is at least 20% molar excess of the moles of said aromatic and moles of said aliphatic dicarboxylic acids;

between 10% and 58.5% of an amine derivative cross-linking resin selected from an aminoplast, a glycoluril, or a phenoplast resin; and

said composition containing a reinforcing low molecular weight polymer selected from a styrene-maleate half ester, an epoxy resin, a mixture of styrene-maleate half ester and epoxy resin, or an alkylene oxide adduct of bisphenol.

4,716,201

FILMS OF BLENDS OF LINEAR ETHYLENE POLYMERS AND AROMATIC POLYMERS

Peter J. Canterino, Towaco, N.J.; David V. Dobreski, Fairport, N.Y., and Richard G. Shaw, Piscataway, N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Mar. 31, 1986, Ser. No. 846,656

The portion of the term of this patent subsequent to Apr. 1, 2003, has been disclaimed.

Int. Cl.[4] C08L 23/18, 23/20, 25/04, 25/16

U.S. Cl. 525—240 12 Claims

1. A method for reducing extruder torque in the extrusion of films of a linear ethylene copolymer of ethylene and a higher olefin having 4–8 carbon atoms and a density of less than 0.94 by blending therein a thermoplastic polymer of an aromatic hydrocarbon which is up to about 10 weight percent of said blend in an amount effective to reduce extruder torque compared to the torque of the linear ethylene copolymer alone, said film having greater stiffness and reduced splittiness compared to films without said thermoplastic polymer of an aromatic hydrocarbon.

4,716,202

PREPARATION OF ALUMINUM IONOMERS OF CARBOXYLIC ACID COPOLYMERS

Howard W. Strauss, Groves, Tex., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Aug. 22, 1986, Ser. No. 899,027

Int. Cl.[4] C08F 8/42

U.S. Cl. 525—370 7 Claims

1. A process for neutralizing with aluminum ion the carboxylic acid groups of a copolymer containing 30 to 95 weight percent units derived from an alpha-olefin containing 2 to 10 carbon atoms, at least 25 weight percent of which is ethylene, 1 to 25 weight percent units derived from an ethylenically unsaturated carboxylic acid containing from 3 to 8 carbon atoms, and from 0 to 60 weight percent derived from a softening comonomer which is a vinyl ester of a carboxylic acid containing 2 to 10 carbon atoms, an alkyl vinyl ether wherein the alkyl group contains from 1 to 10 carbon atoms or alkyl acrylates or methacrylates wherein the alkyl group contains from 1 to 10 carbon atoms, comprising melting the copolymer and mixing therewith an aluminum compound of the formula

$$Al(OH)_n(OC(CH_2)_mCH_3)_{3-n}$$

where m is 0–2 and n is 1–3, adding a volatile organic acid substantially in the absence of water to the mixture whereby the aluminum compound reacts with the carboxylic acid groups of the copolymer, and removing the volatile organic acid by volatilization.

4,716,203

DIBLOCK AND TRIBLOCK COPOLYMERS

Donald J. Casey, Ridgefield; Peter K. Jarrett, Trumbull, and Louis Rosati, Norwalk, all of Conn., assignors to American Cyanamid Company, Stamford, Conn.

Filed Sep. 5, 1986, Ser. No. 903,797

Int. Cl.[4] C08L 71/02; C08G 63/06

U.S. Cl. 525—408 16 Claims

1. A diblock copolymer having a first block comprising a polyalkylene oxide and a second block consisting essentially of glycolic acid ester and trimethylene carbonate linkages.

4,716,204

USE, AS LATENT CROSS-LINKERS FOR EPOXY RESINS, OF COMPOUNDS WHICH CAN BE REARRANGED IN SITU TO DIFUNCTIONAL PHENOLS

Theodore L. Parker, Lafayette, Calif., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 763,866, Aug. 9, 1985, Pat. No. 4,631,331. This application Oct. 3, 1986, Ser. No. 914,849

Int. Cl.[4] C08G 59/14, 59/62; C07D 263/38

U.S. Cl. 525—504 27 Claims

1. A latent mono- or polyphenol of one of the formulas

$$[TE\frac{}{H}]_mQ,\quad T\frac{}{H}EQ]_n \text{ and } [TE\frac{}{H}]_yQ\frac{}{H}D]_{m-y}$$

(A) (B) (C)

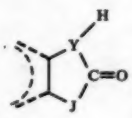
wherein:

m is an integer of 1 to 7, n is 1 or 2 and y is an integer of value less than m,

Q is an organic radical,

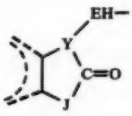
EH is deriveable as follows from D,

D is a group which can react with the Y—H group in a first moiety,



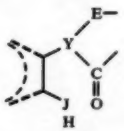
(a)

in which Y and J are as defined below, and)] is a portion of a benzene ring, to convert moiety (a) to a second moiety



(b)

in which —E— is a group of such a nature that EH is an active hydrogen group and moiety (b) can be caused to rearrange to a third moiety

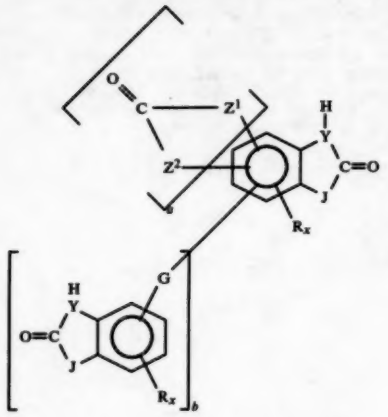


(c)

in which JH is an oxirane-reactive —OH or —SH group, and the carbonyl carbon, Y and E together provide the atoms constituting a stable ring;

and T, independently the same or different in each occurrence, is the residue of a compound of the following formula (L), containing one or two of said moieties of formula (a):

(L)



wherein

one of a and b is zero and the other is zero or 1;

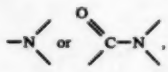
one of Z^1 and Z^2 is YH and the other is J and, when a = 1, Z^1 and Z^2 are attached to adjacent ring carbons;

x, independently in each occurrence is zero, 1, or 2;

R is a non-interfering substituent, independently the same or different in each occurrence;

G is a valence bond, an alkylene or alkenylene group—optionally halosubstituted, CO, O, S, SO, SO_2, SiO;

Y is



independently in each occurrence;

J is O or S, independently in each occurrence;

and the number of Y-H groups in the molecule is 1 or 2.

4,716,205

NICKEL-CATALYZED POLYMERIZATION OF ETHYLENE

Ulrich Klabunde, West Chester, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

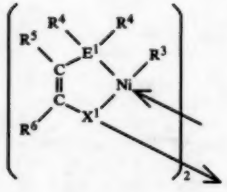
Filed Oct. 15, 1985, Ser. No. 787,149

Int. Cl.[4] C08F *4/80, 10/02*

U.S. Cl. 526—115 **7 Claims**

1. Polymerization process for producing substantially linear and crystalline polyethylene having a molecular weight of at least 1000, said process comprising contacting and reacting ethylene, in an oxygen-free atmosphere, at a temperature in the range of about 0° C. to about 200° C., in the presence of a nickel-containing catalyst selected from:

1(a) The dinickel compound of the formula

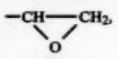


wherein:

R^3 and each R^4, independently, is H or C_{1-20} hydrocarbyl;

X^1 is O or S;

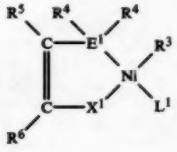
E^1 is P, As or Sb; and each of R^5 and R^6, independently, is H, C_{1-20} hydrocarbyl or a functional group selected from $—OR^2$, —Cl, $—CO_2R^2$, $—CO_2M$, $—C(O)N(R^1)_2$, $—C(O)R^2$, $—SR^2$, $—SO_2R^2$, $—OSO_2R^2$, $—SOR^2$, $—P(O)(OR^2)_{2-y}(R^1)y$, —CN, $—NHR^2$, $—N(R^2)_2$,



$—Si(OR^1)_{3-x}(R^1)_x$, $—OSi(OR^1)_{3-x}(R^1)_x$, $—NO_2$, $—SO_3M$, $—PO_3M_2$ and $—P(O)(OR^2)_2M$

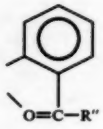
wherein M is alkali or alkaline earth metal, ammonium, quaternary ammonium, phosphonium or arsonium, y is 0, 1 or 2, each R^1, independently, is H or C_{1-20} hydrocarbyl, each R^2, independently, is C_{1-20} hydrocarbyl, and x is 0 or an integer of 1 to 3, or R^5 and R^6, taken together, is a substituted or unsubstituted C_{5-8} alicyclic, C_{5-8} heterocyclic or C_{6-14} aromatic ring, the heteroatom of the heterocyclic ring being selected from O, N and S;

1(B) the nickel compound of the formula



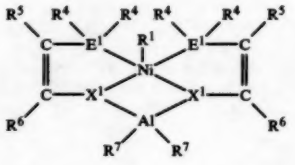
wherein:

R^3, R^4, R^5, R^6, X^1 and E^1 are defined as above and L^1 is a weakly coordinating ligand, or R^3 and L^1 taken together is



wherein R″ is H, C_{1-20} hydrocarbyl or oxyhydrocarbyl or $n(R^2)_2$ wherein R^2 is defined as above:

1(c) the nickel-containing compound of the formula



wherein:

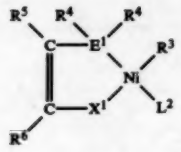
R^1, R^4, R^5, R^6, X^1 and E^1 are defined as above;

each R^7, independently, is H, $—OSi(R‴)_3$, C_{1-20} alkyl or oxyalkyl, C_{6-20} aryl, alkaryl, aralkyl or oxyaryl, $N(R^2)_2$ wherein R^2 is as defined above, or halogen, or both R^7 groups, taken together, is a 5 to 8-membered heterocyclic ring wherein the heteroatom is selected from 0, N and S; and

each R‴, independently, is C_{1-20} alkyl or oxyalkyl, C_{6-20} aryl, alkaryl,. aralkyl or oxyaryl;

(2) the mixture comprising:

(i) the nickel compound of the formula



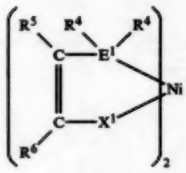
wherein:

R^3, R^4, R^5, R^6, X^1 and E^1 are defined as above and L^2 is a strongly coordinating ligand; and

(ii) an acceptor compound which can react irreversibly with L^2; and

(3) the mixture comprising:

(i) the nickel compound of the formula



wherein:

R^4, R^5, R^6, X^1 and E^1 are defined as above; and

(ii) a suitable alkylating or arylating compound.

4,716,206

PROCESS FOR POLYMERIZATION OF OLEFINS

Masahito Fujita; Masami Kizaki; Makoto Miyazaki, and Naomi Inaba, all of Saitama, Japan, assignors to Toa Nenryo Kogyo Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 811,556, Dec. 19, 1985, Pat. No. 4,634,687, which is a continuation of Ser. No. 647,766, Sep. 6, 1984, abandoned. This application Nov. 5, 1986, Ser. No. 927,551

Claims priority, application Japan, Sep. 22, 1983, 58-174299

Int. Cl.⁴ C08F 4/64

U.S. Cl. 526—139 **6 Claims**

1. A process for the polymerization of an olefin or copolymerization an olefin with another olefin in the presence of a catalyst system comprising

A. a titanium containing catalyst component, and

B. a cocatalyst system comprising

(a) an organoaluminum compound represented by the formula $R^1R^2R^3Al$ wherein R^1, R^2 and R^3, which may be the same or different, each denotes a C_1–C_{20} alkyl, alkenyl, cycloalkyl, aryl, aralkyl, or alkoxy group, or a hydrogen atom,

(b) an organoaluminum halide represented by the formula $R_{3-n}{}^4AlX_n$ wherein R^4 denotes a C_1–C_{20} alkyl, alkenyl, cycloalkyl, aryl, aralkyl or alkoxy group, X denotes a halogen atom and n is equal to or greater than 1,

(c) an electron donor compound containing a nitrogen atom, sulfur atom, oxygen atom or phosphorous atom, and

(d) an aromatic carboxylic acid ester, wherein the molar ratio of component a. to b. is in the range of 90:10 to 30:70, the molar ratio of component c. to d. is in the range of 5:95 to 70:30 nd the molar ratio of component a.+b. to component c.+d. is in the range of 50:50 to 85:15.

4,716,207

NODULAR COPOLYMERS COMPRISING NARROW MWD ALPHA-OLEFIN COPOLYMERS COUPLED BY NON-CONJUGATED DIENES

Charles Cozewith, Westfield; Shiaw Ju, Edison, and Gary W. Verstrate, Matawan, all of N.J., assignors to Exxon Research & Engineering Co., Florham Park, N.J.

Continuation of Ser. No. 681,950, Dec. 14, 1984, abandoned, which is a continuation-in-part of Ser. No. 504,582, Jun. 15, 1983, Pat. No. 4,540,753. This application Sep. 4, 1986, Ser. No. 903,637

Int. Cl.⁴ C08F 4/68

U.S. Cl. 526—169.2 **32 Claims**

1. In a polymerization process for producing a copolymer in the form of polymer chains from a reaction mixture comprising a catalyst, ethylene, and at least one alpha-olefin monomer, the improvement which comprises conducting the polymerization:

(a) in at least one mix-free reactor;

(b) with essentially one active catalyst species;

(c) using at least one reaction mixture which is essentially transfer agent-free;

(d) permitting the polymerization to continue until the copolymer is at least 50% completed;

(e) introducing into the reaction mixture a coupling agent; and

(f) permitting the reaction to continue; thereby incorporating the coupling agent into the polymer so as to form a nodular polymer wherein the polymer chains are linked to the coupling agent.

4,716,208

FLUORINE-CONTAINING COPOLYMERS

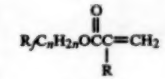
Stephen H. Korzeniowski, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 578,009, Feb. 13, 1984, abandoned, which is a continuation of Ser. No. 479,738, Mar. 28, 1983, abandoned. This application Aug. 14, 1985, Ser. No. 766,069

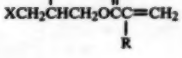
Int. Cl.⁴ C08F 20/22

U.S. Cl. 526—245 **14 Claims**

1. Polymers of (i) from about 50 to about 85 parts by weight of a fluorinated monomer or mixture of fluorinated monomers having the formula



and (ii) from about 50 to about 15 parts by weight of one or more monomers having the formula



wherein

R_f is straight or branched-chain perfluoroalkyl containing 4–20 carbons;

R is H or CH_3;

n is an integer from 1–15; and

X is Cl or Br.

4,716,209

STRONG AND ELASTIC POLYURETHANE POLYUREA POLYACRYLATES AND ELECTRON BEAM-CURED COATINGS CONTAINING THE SAME

Steven R. Schmid, Des Plaines; Robert E. Ansel, and Kevin P. Murray, both of Hoffman Estates, all of Ill., assignors to DeSoto, Inc., Des Plaines, Ill.

Filed Jan. 23, 1986, Ser. No. 824,547

The portion of the term of this patent subsequent to Apr. 8, 2003, has been disclaimed.

Int. Cl.[4] C08F 2/54, 26/02, 226/02

U.S. Cl. 526—261 24 Claims

1. An essentially isocyanate-free radiation-curable polyurethane polyurea polyethylenic oligiomer comprising the reaction product of: (1) organic diisocyanate; (2) a stoichiometric deficiency, based on said diisocyanate, of difunctional materials reactive with isocyanate functionality and consisting essentially of: (A) diol component selected from polycarbonate diol and polyoxyalkylene glycol in which the alkylene group contains from 2–4 carbon atoms, said diol component having a molecular weight of from 200 to 1000; (B) dihydric bisphenol-based alkylene oxide adduct in which the alkylene group contains from 2–4 carbon atoms and containing from 2–10 alkylene groups per molecule; and (C) a diprimary diamine component selected from alkylene diamine and polyoxyalkylene diamine in which the alkylene groups contain from 2–4 carbon atoms, said diamine component having a molecular weight of from about 70 to 800, said components (A) and (B) being present in a weight ratio of from 1:4 to 9:1 and said component (C) being present in an amount of from 30 equivalent percent to 60 equivalent percent of the total equivalents of component (2), the polyurethane polyurea of components (1) and (2) being capped by (3) a monohydric ethylenically unsaturated compound, and the deficiency of difunctional materials reactive with isocyanate functionality and the proportion of said monohydric ethylenically unsaturated compound providing a polyethylenically unsaturated oligomer having a molecular weight in the range of about 5,000 to about 30,000.

4,716,210

USE OF LIQUID, COLD-HARDENING POLYURETHANE-UREA-FORMING COMPONENTS FOR CORROSION-INHIBITING, WEAR-RESISTANT COATINGS ON METAL AND PLASTICS SURFACES AND MOLDINGS AND ON STONE AND CONCRETE

Gerhard Trümmelmeyer, Leichlingen, and Hans-Dieter Ruprecht, Cologne, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Dec. 1, 1982, Ser. No. 446,082

Claims priority, application Fed. Rep. of Germany, Dec. 10, 1981, 3148838

Int. Cl.[4] C08G 18/10, 18/67

U.S. Cl. 528—75 12 Claims

1. A hydrolysis-resistant, low temperature-resistant, elastic polyurethane-urea possessing high strength and abrasion resistance prepared from coldhardening, quick-gelling, solvent-free, liquid components comprising

(A) a liquid mixture having a viscosity below about 6,000 mPa.s/25° C. and an average functionality of the hydroxyl group and amino group compounds of about 2.0 to 2.75 comprising

(1) a polyether polyol component having an average molecular weight of about 500 to 8,000 and a viscosity below about 6,000 mPa.s/25° C. which is

(a) graft modified with about 5 to 40% by weight of polymers and/or copolymers of unsaturated monomers and/or

(b) contains from about 5 to 40% by weight of high molecular weight polyadducts, polycondensates or polymers in dissolved or finely dispersed form;

(2) liquid or low melting aromatic polyamines soluble in (1) and having a molecular weight below about 500

wherein the OH/NH2 equivalent ratio of (1) to (2) is from about 1:1 to 1:10; and

(3) aliphatic tertiary amine catalysts in quantities from about 0.01 to 5% by weight; and

(B) liquid aromatic polyisocyanates having an average isocyanate functionality of from about 2.0 to 2.55 comprising

(1) phosgenation products of the condensation reaction of aniline and/or C_1–C_4-mono- or -di-substituted anilines with formaldehyde or the conversion products of said phosgenation products which are liquid at room temperature and are obtained by the introduction of carbodiimide, allophanate or biuret groups, by trimerization or by modification with low molecular weight polyols, said phosgenation products or said conversion products having a viscosity below about 1000 mPa.s/25° C. and/or

(2) reaction products of (B) (1) with a polyether polyol having a molecular weight from about 400 to 7000 at an NCO/OH equivalent ratio of about 2:1 to 10:1, said reaction products having a viscosity below about 5000 mPa.s/25° C.,

wherein the equivalent ratio of the isocyanate groups of (B) to the isocyanate-reactive groups of (A) is about 0.95:1 to 1.10:1.

4,716,211

SLURRY PROCESS FOR PRODUCING HIGH MOLECULAR WEIGHT CRYSTALLINE POLYARYLETHERKETONES

Robert A. Clendinning, New Providence, and Louis M. Maresca, Belle Mead, both of N.J., assignors to Amoco Corporation, Chicago, Ill.

Continuation of Ser. No. 710,119, Mar. 11, 1985, abandoned. This application May 15, 1986, Ser. No. 867,420

Int. Cl.[4] C08G 8/02, 63/60, 63/62

U.S. Cl. 528—126 8 Claims

1. An improved process for preparing a poly(aryl ether ketone) by reacting nucleophilic coreactants with electrophilic coreactants under Friedel-Crafts polymerization conditions, wherein the improvement comprises carrying out the process in a solvent comprising 1,2-dichloroethane.

4,716,212

PREPARATION OF A HIGH MOLECULAR WEIGHT POLY(ARYLENE SULFIDE KETONE)

Roger G. Gaughan, Piscataway, N.J., assignor to Phillips Petroleum Company

Filed Sep. 5, 1986, Ser. No. 905,615

Int. Cl.[4] C08G 65/38

U.S. Cl. 528—226 12 Claims

1. A method for preparing a poly(arylene sulfide ketone) comprising:

contacting in a reaction mixture (a) at least one polyhalobenzophenone, employing about 1.004:1 to about 1.038:1 molar ratios of alkali metal hydrosulfide relative to said polyhalobenzophenone, and at least one of (b) or (c), wherein (b) is at least one alkali metal sulfide and at least one alkali metal hydrosulfide, and (c) is at least one alkali metal hydroxide and at least one alkali metal hydrosulfide, under polymerization conditions effective for producing the poly(arylene sulfide ketone);

4,716,213

POLYESTERS POLYOLS PREPARED FROM GLUTARIC ACID, SUCCINIC ACID AND ADIPIC ACID, AND POLYURETHANES PREPARED THEREFROM

George N. Altounian, Cap Rouge, and Daniel Grenier, Ste-Foy, both of Canada, assignors to Centre de Recherche Industrielle du Quebec, Quebec, Canada

Continuation of Ser. No. 747,929, Jun. 24, 1985, abandoned, which is a continuation-in-part of Ser. No. 517,397, Jul. 26, 1983, Pat. No. 4,525,574. This application May 27, 1986, Ser. No. 867,617

The portion of the term of this patent subsequent to Jun. 25, 2002, has been disclaimed.

Int. Cl.[4] C08G *18/42*

U.S. Cl. 528—283 6 Claims

1. Process for preparing polyols which comprises

(a) introducing in a reactor a mixture of acids comprising about 35 to 80% by weight of glutaric acid, about 15 to 35% by weight of succinic acid and about 8 to 35% by weight of adipic acid, or esters or anhydrides thereof, with at least one polyhydroxy alcohol selected from the group consisting of secondary alcohols, tertiary alcohols, and highly cluttered alcohols, with a catalyst selected from the group consisting of stannous chloride, stannic chloride and alkyl-tin compounds;

(b) flushing the reaction mixture with an inert gas;

(c) heating the reaction mixture while stirring at a temperature not exceeding about 225° C.;

(d) removing 90 to 95% of the water or methanol formed during step (c);

(e) introducing into the reactor at least one primary alcohol which is not cluttered;

(f) heating to about 225° C. and removing by distillation the maximum of water or methanol;

(g) ending the reaction by placing the reactor under vacuum in order to remove all traces of water or methanol in the reaction mixture and continuing this operation until the polyol obtained has an acid value lower than 3, a hydroxyl functionality at least equal to 2.0 and a hydroxyl number lower than 600.

4,716,214

PROCESS FOR THE PREPARATION OF POLYTETRAMETHYLENE ADIPAMIDE

Reinoud J. Gaymans, Keizerweg 25, 7548 PX Boekelo, and Antonius J. P. Bongers, Julianalaan 37, 6124 AG Papenhoven-Born, both of Netherlands

Continuation of Ser. No. 724,734, Apr. 18, 1985, abandoned. This application Sep. 30, 1986, Ser. No. 913,313

Claims priority, application Netherlands, Apr. 19, 1984, 8401271

Int. Cl.[4] C08G *69/28*

U.S. Cl. 528—335 13 Claims

1. A continuous process for the preparation of white, high molecular weight nylon 4,6 comprising the steps of:

heating in a first reaction zone a reaction mixture comprising the salt of 1,4-diaminobutane and adipic acid, with up to 25 wt. % of at least one other polyamide-forming compound, at a temperature above the solidification point of the reaction mixture and at a pressure between 2 and 100 bars to form a prepolymer-containing liquid reaction mixture, passing the liquid prepolymer mixture to a second reaction zone, wherein the mixture is maintained in a liquid state while the pressure therein is simultaneously reduced to form a second liquid prepolymer having at most 0.20 mgeq pyrrolidine groups per gram of prepolymer; and thereafter

subjecting said second prepolymer liquid to at least one subsequent reaction zone, wherein the liquid prepolymer mixture is maintained in a liquid state.

4,716,215

COMPRESSION MOLDABLE AROMATIC POLYAMIDE POWDER

Hideo Matsui; Hiroshi Fujie, and Takashi Noma, all of Iwakuni, Japan, assignors to Teijin Limited, Osaka, Japan

Filed Feb. 10, 1986, Ser. No. 828,237

Claims priority, application Japan, Feb. 15, 1985, 60-26429; Aug. 27, 1985, 60-186596; Aug. 28, 1985, 60-187324

Int. Cl.[4] C08G *69/32*

U.S. Cl. 528—348 10 Claims

1. An aromatic polyamide compression molding powder, produced by an interfacial polymerization process, comprising porous agglomerates having an average particle size of from 10 to 400 μm and a surface area of from 1 to 20 m^2/g, said agglomerates comprising a plurality of fine coalescible particles which have an average size of from 0.1 to 10 μm, which comprise at least one aromatic amide polymer comprising 40 to 100 molar % of recurring m-phenylene isophthalamide units and 0 to 60 molar % of at least one additional recurring aromatic amide unit.

4,716,216

CRYSTALLINE POLYIMIDES CONTAINING CUMULATIVE PHENYLENE SULFIDE UNITS

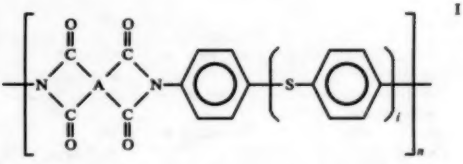
Tohru Takekoshi, Scotia, and Patricia P. Anderson, Albany, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 771,096, Aug. 30, 1985, abandoned. This application Nov. 19, 1986, Ser. No. 932,802

Int. Cl.[4] C08G *69/42, 75/00, 79/02*

U.S. Cl. 528—352 6 Claims

1. A crystalline polyimide consisting essentially of structural units of the formula



I

wherein A is the tetravalent aromatic nucleus of a dianhydride selected from the group consisting of pyromellitic dianhydride; biphenyl-3,3',4,4'-tetracarboxylic dianhydride; 1,4-bis(3,4-dicarboxyphenoxy)benzene dianhydride; and benzophenone-3,3',4,4'-tetracarboxylic dianhydride; i is a whole number of from 2 to 6 and n is a whole number of at least 5.

4,716,217

HYBRID LYMPHOBLASTOID-LEUKOCYTE HUMAN INTERFERONS

Marvin H. Caruthers, Boulder, Colo.; Michael Leineweber, Frankfurt am Main, Fed. Rep. of Germany; Moshe Leitner, Rehovot, Israel, and Yitzhak Stabinsky, Boulder, Colo., assignors to University Patents, Inc., Westport, Conn.

Filed Aug. 31, 1984, Ser. No. 646,866

Int. Cl.[4] C07K *13/00, 15/26;* A61K *45/02*

U.S. Cl. 530—351 8 Claims

1. An antiviral and antiproliferative composition of matter comprising a polypeptide of 166 amino acids and optionally having an additional methionine attached to the ordinary first amino acid at the N-terminus, the amino acid sequence of said polypeptide compound having the formula

H_2N[met]-cys[1]-X-P-Y-B-Z-COOH

wherein X consists essentially of amino acids 2 to 46 of human lymphoblastoid interferon (LbIF); Y consists essentially of amino acids 60 to 85 of said LbIF; Z consists essentially of amino acids 112 to 166 of said LbIF; P consists essentially of

amino acids 47 to 59 of human αC, αF-, or αI-type leukocyte interferon (LeIF) and is gln^{47}-phe-gln-lys^{50}-ala-gln-ala-ileu-ser^{55}-val-leu-his-glu^{59}, or gln^{47}-phe-gln-lys^{50}-thr-gln-ala-ileu-ser^{55}-val-leu-his-glu^{59}; and B consists essentially of amino acids 86 to 111 of human αC-, αF-, or αI-type leukocyte interferon (LeIF) and is ser^{85}-thr-glu-leu-tyr^{90}-gln-gln-leu-asn-asp^{95}-leu-glu-ala-cys-val^{100}-ileu-gln-glu-val-gly^{105}-val-glu-glu-thr-pro^{110}-leu, ser^{86}-thr-glu-leu-asn^{90}-gln-gln-leu-asn-asp^{95}-met-glu-ala-cys-val^{100}-ileu-gln-glu-val-gly^{105}-val-glu-glu-thr-pro^{110}-leu, or ser^{86}-thr-glu-leu-tyr^{90}-gln-gln-leu-asn-asn^{95}-leu-glu-ala-cys-val^{100}-ileu-gln-glu-val-gly^{105}-met-glu-glu-thr-pro^{110}-leu having biological or antiviral activity of human interferon.

4,716,218

GRAIN EXTRACTION MILLING

Li-Fu Chen, and Johan E. Hoff, both of West Lafayette, Ind., assignors to Purdue Research Foundation, West Lafayette, Ind.

Filed Jan. 15, 1986, Ser. No. 819,413
Int. Cl.⁴ C07K *3/02, 3/28*
U.S. Cl. 530—372 **30 Claims**

1. A process for the production of grain oil and dehydrated alcohol comprising the steps of:

cracking the grain;

drying the grain to a moisture content sufficiently low to enable the grain to dehydrate an ethanol solution of greater than 90% ethanol, while simultaneously

extracting grain oil from the dried grain with an ethanol solution of greater than 90% ethanol, and

recovering the grain oil and dehyrated alcohol from the extractant.

4,716,219

ADSORBENT FOR PROTEIN PURIFICATION

Bernhard Eggimann, Basel; Erich Hochuli, Arisdorf, and Alfred Schacher, Riehen, all of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Jan. 23, 1986, Ser. No. 821,728
Claims priority, application Switzerland, Feb. 4, 1985, 490/85
Int. Cl.⁴ C07K *3/20*
U.S. Cl. 530—413 **13 Claims**

1. An adsorbent comprising an electroneutral carrier matrix, —O—CH_2—CH(OH)—CH_2—NH— groups as a spacer and a triazine colouring substance bonded to the spacer, which adsorbent is characterized by providing high flow rates and a large loading capacity.

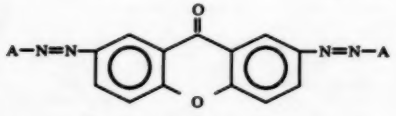
4,716,220

DISAZO COMPOUNDS WITH XANTHONE NUCLEUS FOR ELECTROPHOTOGRAPHY

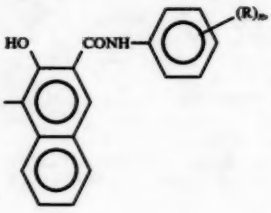
Kyoji Tsutsui, Mishima, Japan, assignor to Ricoh Co., Ltd., Tokyo, Japan

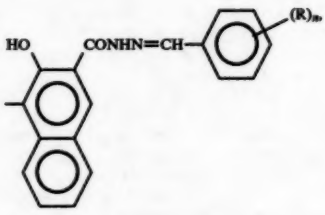
Division of Ser. No. 597,991, Apr. 9, 1984, Pat. No. 4,540,643.
This application Jul. 9, 1985, Ser. No. 753,281
Claims priority, application Japan, Apr. 26, 1983, 58-73177; Apr. 28, 1983, 58-75586
Int. Cl.⁴ C09B *35/03*; G03G *5/06, 5/14*
U.S. Cl. 534—738 **15 Claims**

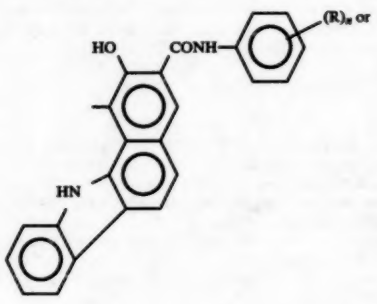
1. A disazo compound represented by the formula

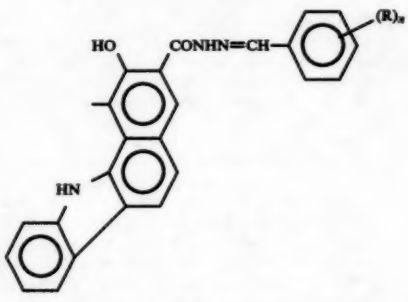


wherein, A stands for









wherein, R stands for alkyl, alkoxy, nitro, halogen, cyano or halomethyl; n stands for an integer of 0, 1, 2 or 3; and in case n is an integer of 2 or 3, each R is the same or different.

4,716,221
4'-DEMETHYL-4-EPIPODOPHYLLOTOXIN DERIVATIVE

Hamao Umezawa; Tomio Takeuchi, both of Tokyo; Shinichi Kondo, Yokohama; Wataru Tanaka, Hoya; Tomohisa Takita, Asaka; Yoshio Nishimura, Yokohama, and Hiroshi Yoshikawa, Fujioka, all of Japan, assignors to Zaidan Hojin Biseibutsu Kegaku Kenkyu Kai, Tokyo, Japan

Filed Mar. 21, 1986, Ser. No. 842,286
Claims priority, application Japan, Apr. 2, 1985, 60-68424
Int. Cl.[4] C07H *15/24*
U.S. Cl. 536—17.2 1 Claim

1. 4-O-(2-deoxy-2-dimethylamino-4,6-O-ethylidene-β-D-glucopyranosyl)-4'-demethyl-4-epipodophyllotoxin and salt thereof.

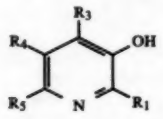
4,716,222
SUBSTRATES FOR HYDROLASES

Kurt Wallenfels, Freiburg, Fed. Rep. of Germany, and Ahmed M. Fathy, Heliopolis, Egypt, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Apr. 5, 1985, Ser. No. 720,347
Claims priority, application Fed. Rep. of Germany, Apr. 6, 1984, 3412939
Int. Cl.[4] C07H *17/02*
U.S. Cl. 536—18.7 12 Claims

1. A compound of the formula A—O—B, in which A represents the radical in the ion A—O⁻ of a heterocyclic compound A—OH with an acid pK_a, whose absorbance is measured photometrically after hydrolysis of A—O—B, while B is the radical in a compound B—OH which makes the compound specific for the reaction with a given enzyme, and where A—OH is selected from the group consisting of:

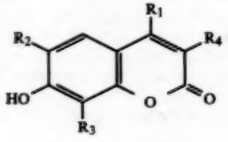
a. a compound of the formula I



I

in which R_1 can be OH, NO_2 or halogen, and R_3, R_4 and R_5 can be H or NO_2, at the most two NO_2 being present,

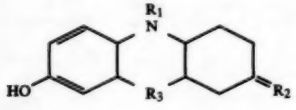
b. a compound of the formula II



II

in which R_1 can be H or alkyl with 1–12 carbon atoms, and R_2, R_3 or R_4 can be H or NO_2, one or two NO_2 being present,

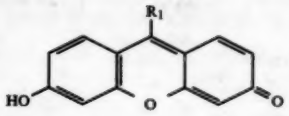
c. a compound of the formula III



III

in which R_1 can be 0 or an electron pair, R_2 can be O, S or $N(CH_3)_2$, and R_3 can be O or S and

d. a compound of the formula IV



IV

in which R_1 can be aryl, and B—OH is a sugar or sugar derivative.

4,716,223
METHOD FOR PREPARING GANGLIOSIDE DERIVATIVES AND USE THEREOF IN PHARMACEUTICAL COMPOSITIONS

Francesco della Valle, Padua, and Aurelio Romeo, Rome, both of Italy, assignors to FIDIA, S.p.A., Abano Terme, Italy

Continuation of Ser. No. 425,462, Sep. 28, 1982, Pat. No. 4,593,091, which is a continuation-in-part of Ser. No. 290,106, Aug. 4, 1981, Pat. No. 4,476,119. This application Mar. 10, 1986, Ser. No. 837,201
The portion of the term of this patent subsequent to Jun. 3, 2003, has been disclaimed.
Int. Cl.[4] C08B *37/00*; C07H *5/04*
U.S. Cl. 536—53 11 Claims

1. A method for preparing inner ester ganglioside derivatives which comprises:

(a) subjecting a ganglioside or mixture of gangliosides to ion exchange to convert the carboxylate groups in said gangliosides to a salt thereof;

(b) dissolving the thus prepared salt of a ganglioside or mixture of gangliosides in a non-aqueous organic solvent; and

(c) reacting said salt of a ganglioside or mixture of gangliosides with a lactonization reagent to form at least one lactonic bond in said inner ester ganglioside derivatives.

4,716,224
CROSSLINKED HYALURONIC ACID AND ITS USE

Katukiyo Sakurai; Yoshio Ueno, and Takashi Okuyama, all of Higashiyamato, Japan, assignors to Seikagaku Kogyo Co. Ltd., Tokyo, Japan

Filed May 2, 1985, Ser. No. 729,558
Claims priority, application Japan, May 4, 1984, 59-88440; Jan. 17, 1985, 60-4908; Jan. 22, 1985, 60-8512; Jan. 29, 1985, 60-13595; Mar. 15, 1985, 60-50357
Int. Cl.[4] A61K *7/00, 31/725*
U.S. Cl. 536—55.1 11 Claims

1. A crosslinked hyaluronic acid or a pharmaceutically acceptable salt thereof produced by crosslinking hyaluronic acid or a pharmaceutically acceptable salt thereof with a polyfunctional epoxy compound selected from the group consisting of halomethyloxirane compounds and a bisepoxy compound selected from the group consisting of 1,2-bis(2,3-epoxypropoxy) ethane, 1,4-bis(2,3-epoxypropoxy) butane, 1,6-bis(2,3-epoxypropoxy) hexane and a diglycidyl ether of biophenol A or bisphenol F, which has a crosslinking index of 5 to 20 per 1000 repeating disaccharide units composed of glucoronic acid and N-acetylglucosamine in hyaluronic acid, said crosslinked hyaluronic acid or pharmaceutically acceptable salt thereof being water soluble and stringy.

4,716,225
RADIOOPAQUE SUGAR DERIVATIVES AND A METHOD OF METABOLIC MAPPING USING THE SAME

Robert S. Ledley, Silver Spring, Md., and Douglas M. Gersten, Washington, D.C., assignors to Georgetown University, Washington, D.C.

Continuation-in-part of Ser. No. 685,227, Dec. 27, 1984, which is a continuation of Ser. No. 385,730, Jun. 7, 1982, abandoned. This application Sep. 30, 1985, Ser. No. 781,494

Int. Cl.[4] A61K *31/70, 49/04*

U.S. Cl. 536—122 19 Claims

1. A method of metabolically mapping one or more central nervous system components of a mammalian body by computerized axial tomography scanning which comprises:

(a) injecting an effective amount of a 2-,5-, or 6-iodo-substituted hexose, as a contrast medium, into said mammalian body, and

(b) scanning the mammalian body by computerized axial tomography, thereby visualizing the concentration flux of said hexose in the central nervous system component or components.

4,716,226
OPTICALLY ACTIVE 4-CARBALKOXY-2-AZETIDINONES

Stéphane Gero, Les Ulis; Jeanine Cleophax, Palaiseau, and Alice Gateau-Olesker, Gif-Sur-Yvette, all of France, assignors to Roussel Uclaf, Paris, France

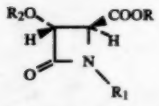
Filed Oct. 28, 1985, Ser. No. 791,774

Claims priority, application France, Nov. 2, 1984, 84 16759

Int. Cl.[4] C07D *205/08;* C07B *41/04, 41/02, 53/00*

U.S. Cl. 540—200 3 Claims

1. A 2-azetidinone of the formula



wherein R is alkyl of 1 to 4 carbon atoms, R_1 is selected from the group consisting of hydrogen, —OH, protected hydroxy and —OCH_2—COOR′, R′ is selected from the group consisting of hydrogen and alkyl of 1 to 4 carbon atoms and R_2 is a hydroxyl protective group.

4,716,227
PROCESS FOR MANUFACTURING CEPHALOSPORIN ESTERS

André Furlenmeier, Basle, Switzerland, assignor to Hoffmann-La Roche Inc., Nutley, N.J.

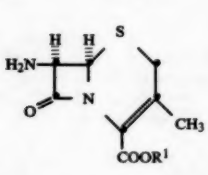
Filed Nov. 7, 1985, Ser. No. 795,948

Claims priority, application Switzerland, Nov. 15, 1984, 5470/84

Int. Cl.[4] C07D *501/18;* A61K *31/545*

U.S. Cl. 540—230 15 Claims

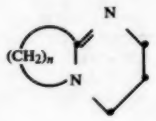
1. A process for producing a cephalosporin ester of the formula



Ia

wherein R^1 is a group which is readily removable by hydrolysis,

which process comprises reacting 7-amino-3-methyl-3-cephem-4-carboxylic acid in a partially chlorinated lower alkane selected from the group consisting of methylene chloride or chloroform with a bicyclic amidine of the formula



wherein n is the integer 3, 4 or 5, and a halide of the formula

III

wherein X is halogen and R^1 has the above significance, thereby producing compound Ia.

4,716,228
CONDENSED 2-SUBSTITUTED THIAZOLE DERIVATIVES

Ugo Scarponi, Arese; Anna M. Lazzarini, Seregno; Daniela Toti, Bettola, and Roberto de Castiglione, Milan, all of Italy, assignors to Farmitalia Carlo Erba S.p.A., Milan, Italy

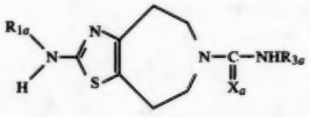
Filed Mar. 17, 1986, Ser. No. 839,935

Claims priority, application United Kingdom, Mar. 23, 1985, 8507595

Int. Cl.[4] C07D *484/04, 417/04;* A61K *31/55*

U.S. Cl. 540—578 4 Claims

1. A compound of the general formula Ia



(Ia)

wherein R_{1a} represents a hydrogen atom or an amidino group, R_{3a} represents a hydrogen atom, a saturated or unsaturated, linear or branched acyclic hydrocarbon group having from 1 to 6 carbon atoms, a cycloalkyl group having from 3 to 7 carbon atoms, a phenyl group, a mono- or di-substituted phenyl group (the substituent(s) being selected from alkyl groups having from 1 to 4 carbon atoms, methylthio, methoxy, amino, acetylamino or methylenedioxy groups or fluorine, bromine or chlorine atoms), a benzyl group, a mono- or di-substituted benzyl group (the substituent(s) being as above defined) and X_a represents an oxygen or sulphur atom, an imino, cyanoimino or nitromethylene group or a group of the formula $CHSO_2R_{3a}$ or $NCOR_{3a}$ wherein R_{3a} is as above defined, or a pharmaceutically acceptable salt thereof.

4,716,229
NEW PYRIMIDINES AND A PROCESS FOR THE PREPARATION OF PYRIMIDINES

Erich Klauke, Odenthal; Bernd Baasner, and Karl H. Schündehütte, both of Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Continuation of Ser. No. 636,458, Jul. 31, 1984, abandoned. This application Jul. 14, 1986, Ser. No. 885,041

Claims priority, application Fed. Rep. of Germany, Aug. 4, 1983, 3328154

Int. Cl.[4] C07D *239/30*

U.S. Cl. 544—334 12 Claims

1. A pyrimidine of the formula

wherein

R^1 denotes fluorine or trifluoromethyl, and

R^2 denotes fluorine, chlorine or trifluoromethyl.

4,716,230

CERTAIN BIS(DI-2 OR 4-PYRIDYL-PHOSPHINO) ALKANES #10 HAVING ANTI-TUMOR PROPERTIES

David T. Hill, North Wales, Pa., assignor to Smithkline Beckman Corporation, Philadelphia, Pa.

Continuation-in-part of Ser. No. 723,778, Apr. 16, 1985, abandoned. This application Mar. 25, 1986, Ser. No. 843,886

Int. Cl.[4] C07F *9/58;* A61K *33/42*

U.S. Cl. 546—21 4 Claims

1. A compound of the formula

$$(R)_2—P—A—P—(R)_2$$

wherein:

R is the same and is 2-pyridyl or 4-pyridyl, and

A is a straight or branched alkanediyl chain of from one to six carbon atoms.

4,716,231

CHLORINATION OF 2-METHOXYNICOTINIC ACID

Carl J. Goddard, Croton, Conn., assignor to Pfizer Inc., New York, N.Y.

Filed Apr. 27, 1987, Ser. No. 43,056

Int. Cl.[4] C07D *213/80, 213/803*

U.S. Cl. 546—298 6 Claims

1. A process for chlorinating 2-methoxynicotinic acid at the 5-position of the molecule, which comprises subjecting said acid to the chlorinating activity of an alkali metal hypochlorite in a homogeneous aqueous solvent system at a temperature that is in the range of from about 10° C. up to about 30° C. until said chlorination reaction is substantially complete.

4,716,232

1-(VINYL PHOSPHONATE ADDUCT) PYRAZOLIDINONES

Robert J. Ternansky, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

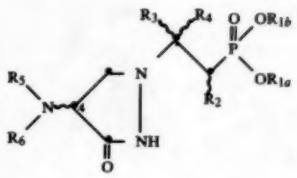
Filed May 14, 1986, Ser. No. 862,913

Claims priority, application European Pat. Off., Apr. 28, 1986, 86303174.6

Int. Cl.[4] C07F *9/58, 9/65*

U.S. Cl. 548—112 18 Claims

1. A compound of the formula:



wherein:

$R_1{}^a$ and $R_1{}^b$ are the same or different and are C_1 to C_6 alkyl or phenyl;

R_2 is hydrogen, halo, C_1 to C_6 alkyl, C_1 to C_6 alkyl substituted by one or two halogen, hydroxy, protected hydroxy, amino, protected amino, C_1 to C_7 acyloxy, nitro, carboxy, protected carboxy, carbamoyl, carbamoyloxy, cyano, methylsulfonylamino or C_1 to C_4 alkoxy groups, perfluoro C_2 to C_4 alkyl, C_7 to C_{12} arylalkyl group substituted on the C_1 to C_6 alkyl portion with one or two groups chosen from halogen, hydroxy, protected hydroxy, amino, protected amino, C_1 to C_7 acyloxy, nitro, carboxy, protected carboxy, carbamoyl, carbamoyloxy, cyano, N-(methylsulfonylamino) or C_1 to C_4 alkoxy; and/or the phenyl group maybe substituted with 1 or 2 groups chosen from halogen, hydroxy, protected hydroxy, nitro, C_1 to C_6 alkyl, C_1 to C_4 alkoxy, carboxy, protected carboxy, carboxymethyl, protected carboxymethyl, hydroxymethyl, protected hydroxymethyl, aminomethyl, protected aminomethyl, or an N-(methylsulfonylamino) group, phenyl, a phenyl group substituted with one or two moieties chosen from the group consisting of halogen, hydroxy, protected hydroxy, cyano, nitro, C_1 to C_6 alkyl, C_1 to C_4 alkoxy, carboxy, protected carboxy, carboxymethyl, protected carboxymethyl, hydroxymethyl, protected hydroxymethyl, aminomethyl, protected aminomethyl, trifluoromethyl or N-(methylsulfonylamino), 1,3-thaizol-2-yl, 4-(protected carboxymethyl)-5-methyl-1,3-thiazol-2-yl, 1,2,4-thiadiazol-5-yl, 3-methyl-1,2,4-thiadiazol-5-yl, 1,3,4-triazol-5-yl, 2-methyl-1,3,4-triazol-5-yl, 2-hydroxy-1,3,4-triazol-5-yl, 2-(protected carboxy)-4-methyl-1,3,4-triazxol-5-yl, 1,3-oxazxol-2-yl, 1,3,4-oxadiazol-5-yl, 2-methyl-1,3,4-oxadiazol-5-yl, 2-(hydroxymethyl)-1,3,4-oxadiazol-5-yl, 1,2,4-oxadiazol-5-yl, 1,3,4-thiadiazol-5-yl, 2-methyl-1,3,4-thiadiazol-5-yl, 2-thiol-

1,3,4-thiadiazol-5-yl, 2-(methylthio)-1,3,4-thaidiazol-5-yl, 2-amino-1,3,4-thiadiazol-5-yl, 1H-tetrazol-5-yl, 1-methyl-1H-tetrazol-5-yl, 1-(1-(dimethylamino)eth-2-yl)-1H-tetrazol-5-yl, 1-(protected carboxymethyl)-1H-tetrazol-5-yl, 1-(carboxymethyl)-1H-tetrazol-5-yl sodium salt, 1-(methysulfonic acid)-1H-tetrazol-5-yl, 1-(methylsulfonic acid)-1H-tetrazol-5-yl sodium salt, 2-methyl-1H-tetrazol-5-yl, 1,2,3-trazol-5-yl, 1-methyl-1,2,3-triazol-5-yl, 2-methyl-1,2,3-triazol-5-yl, 4-methyl-1,2,3-triazol-5-yl, pyrid-2-yl N-oxide, 6-methoxy-2-(N-oxide)-pyridaz-3-yl, 6-hydroxypyridaz-3-yl, 1-methylpyrid-2-yl, 1-methylpyrid-4-yl, 2-hydroxypyrimid-4-yl, 1,4,5,6-tetrahydro-5,6-dioxo-4-methyl-as-trazin-3-yl, 1,4,5,6-tetrahydro-4-(formylmethyl)-5,6-dioxo-as-triazin-3-yl, 2,5-dihydro-5-oxo-6-hydroxy-as-triazin-3-yl, 2,5-dihydro-5-oxo-6-hydroxy-as-trazin-3-yl sodium salt, 2,5-dihydro-5-oxo-6-hydroxy-2-methyl-as-triazin-3-yl sodium salt, 2,5-dihydro-5-oxo-6-hydroxy-2-methyl-as-triazin-3-yl, 2,5-dihydro-5-oxo-6-methoxy-2-methyl-as-triazin- 3-yl, 2,5-dihydro-5-oxo-as-triazin-3-yl, 2,5-dihydro-5-oxo-2-methyl-as-triazin-3-yl, 2,5-dihydro5-oxo-2,6-dimethyl-as-triazxin-3-yl, tetrazolo[1,5-b]pyridazin-6-yl and 8-aminotetrazxolo[1,5-b]pyridazin-6-yl, 4-(protected carboxymethyl)-5-methyl-1,3-thiazol-2-yl, 1,3,4-triazol-5-yl, 2-methyl-1,3,4-triazol-5-yl, 1H-tetrazol-5-yl, 1-methyl-1H-tetrazol-5-yl, 1-(1-(dimethylamino)eth-2-yl)-1H-tetrazol-5-yl, 1-(protected carboxymethyl)-1H-tetrazol-5-yl, 1-(methylsulfonic acid)-1H-tetrazol-5-yl, 1-(methylsulfonic acid)-1H-tetrazol-5-yl sodium salt, 1,2,3-triazol-5-yl, 1,4,5,6-tetrahydro-5,6-dioxo-4-methyl-as-triazin-3-yl, 1,4,5,6-tetrahydro-4-(2-formylmethyl)-5,6-dioxo-as-triazin-3-yl, 2,5-dihydro-5-oxo-6-hydroxy-2-methyl-as-triazin-3-yl sodium salt, 2,5-dihydro-5-oxo-6-hydroxy 2-methyl-as-triazin-3-yl, tetrazolo[1,5-b]pyridazin-6-yl, and 8-aminotetrazolo[1,5-b]pyridazin-6-yl, nitro or cyano; a group of the formula

a group of the formula

$$-COR_8$$

wherein R_8 is hydrogen, C_1 to C_6 alkyl, C_1 to C_6 alkyl substituted by one or two halogen, hydroxy, protected hydroxy, amino, protected amino, C_1 to C_7 acyloxy, nitro, carboxy, protected carboxy, carbamoyl, carbamoyloxy, cyano, methylsulfonylamino or C_1 to C_4 alkoxy groups, perfluoro C_2 to C_4 alkyl, C_7 to C_{12} arylalkyl group substituted on the C_1 to C_6 alkyl portion with one or two groups chosen from halogen, hydroxy, protected hydroxy, amino, protected amino, C_1 to C_7 acyloxy, nitro, carboxy, protected carboxy, carbamoyl, carbamoyloxy, cyano, N-(methylsulfonylamino) or C_1 to C_4 alkoxy; and/or the phenyl group may be substituted with 1 or 2 groups chosen from halogen, hydroxy, protected hydroxy, nitro, C_1 to C_6 alkyl, C_1 to C_4 alkoxy, carboxy, protected carboxy, carboxy methyl, protected carboxymethyl, hydroxymethyl, protected hydroxymethyl, aminomethyl, protected aminomethyl, or a N-methylsulfonylamino) group, phenyl, a phenyl group substituted with one or two moieties chosen from the group consisting of halogen, hydroy, protected hydroxy, cyano, nitro, C_1 to C_6 alkyl, C_1 to C_4 alkoxy, carboxy, protected carboxy, carboxymethyl, protected carboxymethyl, hydroxymethyl, protected hydroxymethyl, aminomethyl, protected aminomethyl, trifluoromethyl or N-(methulsulfonylamino), amino, an amino group with one substituent chosen from the group consisting of phenyl, a phenyl group substituted with one or two moieties chosen from the group consisting of halogen, hydroxy, protected hydroxy, cyano, nitro, C_1 to C_6 alkyl, C_1 to C_4 alkoxy, carboxy, protected carboxy, carboxymethyl, protected carboxymethyl, hydroxymethyl, protected hydroxymethyl, aminomethyl, protected aminomethyl, trifluoromethyl or N-(methylsulfonylamino), C_1 to C_6 alkyl, and C_7 to C_{12} aralkyl, or an amino group with two substituents chosen from the group consisting of phenyl, a phenyl group substituted with one or two moieties chosen from the group consisting of halogen, hydroxy, protected hydroxy, cyano, nitro, C_1 to C_6 alkyl, C_1 to C_4 from the group consisting of halogen, hydroxy, protected hydroxy, cyano, nitro, C_1 to C_6 alkyl, C_1 to C_4 alkoxy, carboxy, protected carboxy, carboxymethyl, protected carboxymethyl, hydroxymethyl, protected hydroxymethyl, aminomethyl, protected aminomethyl, trifluoromethyl or N-(methylsulfonylamino); or

a group of the formula

$$-CH_2-S-A$$

wherein A is 1,3-thiazol-2-yl, 4-(protected carboxymethyl)-5-methyl-1,3-thiazol-2-yl, 1,2,4-thiadiazol-5-yl, 3-methyl-1,2,4-thiadiazol-5-yl, 1,3,4-triazol-5-yl, 2-methyl-1,3,4-triazol-5-yl, 2-hydroxy-1,3,4-triazol-5-yl, 2-(protected carboxy)-4-methyl-1,3,4-triazol-5-yl, 1,3-oxazol-2-yl, 1,3,4-oxdiazol-5-yl, 2-methyl-1,3,4-oxadiazol-5-yl, 2-(hydroxymethyl)-1,3,4-oxadiazol-5-yl, 1,2,4-oxadiazol-5-yl, 1,3,4-thiadiazol-5-yl, 2-methyl-1,3,4-thiadiazol-5-yl, 2-thiol-1,3,4-thiadiazol-5-yl, 2-(methylthio)-1,3,4-thiadiazol-5-yl, 2-amino-1,3,4-thiadiazol-5-yl, 1H-tetrazol-5-yl, 1-methyl-1H-tetrazol-5-yl, 1-(1-(dimethylamino)eth-2-yl)-1H-tetrazol-5-yl, 1-(protected carboxymethyl)-1H-tetrazol-5-yl, 1-(carboxymethyl)-1H-tetrazol-5-yl sodium salt, 1-(methylsulfonic acid)-1H-tetrazol-5-yl, 1-(methylsulfonic acid)-1H-tetrazol-5-yl sodium salt, 2-methyl-1H-tetrazol-5-yl, 1,2,3,-triazol-5-yl, 1-methyl-1,2,3-triazol-5-yl, 2-methyl-1,2,3-triazol-5-yl, 4-methyl-1,2,3-triazxol-5-yl, pyrid-2-yl N-oxide, 6-methoxy-2-(N-oxide)-pyridaz-3-yl, 6-hydroxypyridaz-3-yl, 1-methylpyrid-2-yl, 1-methylpyrid-4-yl, 2-hydroxypyrimid-4-yl, 1,4,5,6-tetrahydro-5,6-dioxo-4-methyl-as-triazin-3-yl, 1,4,5,6-tetrahydro-4-(formylmethyl)-5,6-dioxo-as-triazin-3-yl, 2,5-dihydro-5-oxo-6-hydroxy-as-triazin-3-yl, 2,5-dihydro- 5-oxo-6-hydroxy-as-triazin-3-yl sodium salt, 2,5-dihydro-5-oxo-6-hydroxy-2-methyl-as-triazin-3-yl sodium salt, 2,5-dihydro-5-oxo-6-hydroxy-2-methyl-as-triazin-3-yl, 2,5-dihydro-5-oxo-6-methoxy-2-methyl-as-triazin-3-yl, 2,5-dihydro-5-oxo-as-triazin-3-yl, 2,5-dihydro-5-oxo-2-methyl-as-triazin-3-yl, 2,5-dihydro-5-oxo-2,6-dimethyl-as-triazin-3-yl, tetrazolo[1,5-b]pyridazin-6-yl and 8-aminotetrazolo[1,5-b]pyridazin-6-yl, 4-(protected carboxymethyl)-5-methyl-1,3-thiazol-2-yl, 1,3,4-triazol-5-yl, 2-methyl-1,3,4-triazol-5-yl, 1H-tetrazol-5-yl, 1-methyl-1H-tetrazol-5-yl, 1-(1-(dimethylamino)eth-2-yl)-1H-tetrazol-5-yl, 1-(protected carboxymethyl)-1H-tetrazol-5-yl, 1-(methylsulfonic acid)-1H-tetrazol-5-yl, sodium salt, 1,2,3-triazol-5-yl, 1,4,5,6-tetrahydro-5,6-dioxo-4-methyl-as-triazin-3-yl, 1,4,5,6-tetrahydro-4-(2-formylmethyl)-5,6-dioxo-as-triazin-3-yl, 2,5-dihydro-5-oxo-6-hydroxy-2-methyl-as-triazin-3-yl sodium salt, 2,5-dihydro-5-oxo-6-hydroxy-2-methyl-as-triazin-3-yl, tetrazolo[1,5-b]pyridazin-6-yl, and 8-aminotetrazolo[1,5-b]pyridazin-6-yl;

R_3 and R_4 are the same or different and are hydrogen, C_1 to C_6 alkyl, C_1 to C_6 alkyl substituted by one or two halogen, hydroxy, protected hydroxy, amino, protected amino, C_1 to C_7 acyloxy, nitro, carboxy, protected carboxy, carbamoyl, carbamoyloxy, cyano, methylsulfonylamino or C_1 to C_4 alkoxy groups, C_7 to C_{12} arylalkyl, C_7 to C_{12} arylalkyl group substituted on the C_1 to C_6 alkyl portion with one or two groups chosen from halogen, hydroxy, protected hydroxy, amino, protected amino, C_1 to C_7 acyloxy, nitro, carboxy, protected carboxy, carbamoyl, carbamoyloxy, cyano, N-(methylsulfonylamino) or C_1 to C_4 alkoxy; and-/or the phenyl group may be substituted with 1 or 2 groups chosen from halogen, hydroxy protected hydroxy, nitro, C_1 to C_6 alkyl, C_1 to C_4 alkoxy, carboxy, protected carboxy, carboxymethyl, protected carboxymethyl, hydroxymethyl, protected hydroxymethyl, aminomethyl, protected aminomethyl, or an N-(methylsulfonylamino) group, or R_3 and R_4 are the same or different and are phenyl, a phenyl group substituted with one or two moieties chosen from the group consisting of halogen, hy-

droxy protected hydroxy, cyano, nitro, C_1 to C_6 alkyl, C_1 to C_4 alkoxy, carboxy, protected carboxy, carboxymethyl, protected carboxymethyl, hydroxymethyl, protected hydroxymethyl, aminomethyl, protected aminoethyl, trifluoromethyl or N-(methylsulfonylamino), or a group of the formula

$$-COOR_{11}$$

wherein R_{11} has the same definition as R_9;

R_5 and R_6 are:

(1) each hydrogen;

(2) taken together and form a phthalimido group; or

(3) different and are either hydrogen or an amino-protecting group;

or a pharmaceutically-acceptable salt thereof.

4,716,233
PROCESS FOR PREPARING PHTHALIMIDO ISOXAZOLES

Jing-Jong Lu, and Herbert L. Wehrmeister, both of Terre Haute, Ind., assignors to International Minerals & Chemical Corp., Terre Haute, Ind.

Division of Ser. No. 765,964, Aug. 15, 1985, Pat. No. 4,593,024. This application Feb. 28, 1986, Ser. No. 834,686

Int. Cl.[4] C07D *261/04*

U.S. Cl. 548—245 **1 Claim**

1. The process of making 3-chloro-4-phthalimido-4,5-dihydroisoxazole, which comprises reacting a phthaloyl-containing compound with D-cycloserine to form a phthalimide with the 4-amino group of the D-cycloserine and reacting said phthalimide compound with a phosphorous chloride to form the imidoyl chloride, 3-chloro-4-phthalimido-4,5-dihydroisoxazole.

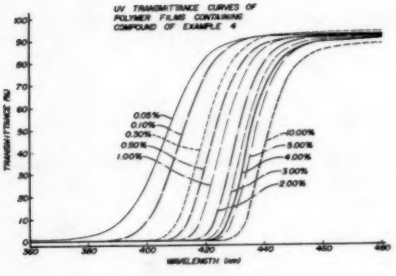
4,716,234
ULTRAVIOLET ABSORBING POLYMERS COMPRISING 2-(2'-HYDROXY-5'-ACRYLOYLOXYALKOXYPHENYL)-2H-BENZOTRIAZOLE

Gary B. Dunks, Upland; Akira Yamada, Claremont, both of Calif.; Charles D. Beard, Montchanin, Del., and Namassivaya Doddi, Upland, Calif., assignors to Iolab Corporation, Covina, Calif.

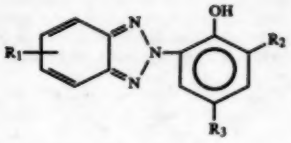
Filed Dec. 1, 1986, Ser. No. 937,171

Int. Cl.[4] C07D *249/16*; C08F *232/08, 120/36*

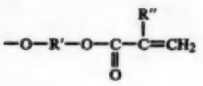
U.S. Cl. 548—259 **9 Claims**



1. A compound of the formula



wherein R_1 is H, halogen or alkoxy of 1 to 3 carbon atoms, R_2 is selected from the group consisting of H, CH_3, and t-alkyl of 4 to 6 carbon atoms, and R_3 is



wherein R' is C_{2-10} alkylene which may be straight chain or branched, and R" is H, CH_3 or CH_2X where X is halogen.

4,716,235
PROCESS FOR PREPARING N-[1(S)-ETHOXYCARBONYL-3-PHENYLPROPYL]-L-ALANYL-L-PROLINE

Satomi Takahashi, Kobe; Kenji Inoue; Yoshifumi Yanagida, both of Takasago; Takehisa Ohashi, Kobe, and Kiyoshi Watanabe, Akashi, all of Japan, assignors to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Aug. 25, 1986, Ser. No. 900,051

Claims priority, application Japan, Aug. 27, 1985, 60-188243

Int. Cl.[4] C07D *207/09*

U.S. Cl. 548—533 **6 Claims**

1. A process for preparing N-[1(S)-ethoxycarbonyl-3-phenylpropyl]-L-alanyl-L-proline, which comprises reacting an N-carboxyanhydride of N-[1(S)-ethoxycarbonyl-3-phenylpropyl]-L-alanine with L-proline in an amount of 1 to 1.5 moles of L-proline per mole of the N-carboxyanhydride in the presence of at least one base selected from the group consisting of an hydroxide of an alkali metal, a carbonate of alkali metal, an hydrogencarbonate of an alkali metal, a secondary amine, a tertiary amine and a quarternary ammonium hydroxide, in a mixture of water and an organic solvent, at a temperature of from −20° C. to room temperature and with pH of the reaction system maintained within an alkaline range.

4,716,236
METHOD FOR SYNTHESIZING ESTERS

Frederick E. Ward, and Kin F. Yip, both of Elkhart, Ind., assignors to Miles Laboratories, Inc., Elkhart, Ind.

Continuation of Ser. No. 597,337, Apr. 6, 1984, abandoned. This application Dec. 5, 1985, Ser. No. 805,254

Int. Cl.[4] C07D *207/36*

U.S. Cl. 548—556 **6 Claims**

1. The method of preparing the compound 3-(N-tosyl-L-alaninyloxy)-5-phenylpyrrole which consists essentially of reacting 3-hydroxy-5-phenylpyrrole and N-tosyl-L-alaninylchloride in the presence of a solvent used for esterification, said solvent being selected from the group consisting of tetrahydrofuran, methylene chloride, chloroform, acetone, diethylether and benzene; a weak organic base selected from the group consisting of pyridine and 2,6-lutidine; and about 2.4 equivalents of trifluoroacetic acid based on about 1.2 equivalent of N-tosyl-L-alaninylchloride.

4,716,237

PROCESS FOR THE PRODUCTION OF 3-OXONITRILES

Karlheinz Drauz, Freigericht; Axel Kleemann, Hanau, and Elisabeth Wolf-Heuss, Mosbach, all of Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany

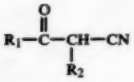
Filed Mar. 15, 1983, Ser. No. 475,395

Claims priority, application Fed. Rep. of Germany, Mar. 16, 1982, 3209472

Int. Cl.[4] C07D *333/24*; C07C *121/34, 121/76*

U.S. Cl. 549—72 17 Claims

1. A process for the production of a 3-oxonitrile of the formula



(I)

in which R_1 is a tertiary alkyl group, cycloalkyl group, aromatic hydrocarbon group or heteroaromatic group which is a pyridine group, piperidine group, thiazole group, furan group, thiophene group, pyrane group, morpholine group, benzothiazole group, pyrrole group, benzopyrrole group, quinoline group or oxazole group, or such a group containing a substituent non-reactive with sodium hydride and R_2 is hydrogen, an alkyl group having 1 to 4 carbon atoms or such an alkyl group substituted by an aryl group, an aryl group containing a substituent non-reactive with sodium hydride, a heteroaromatic group, which is a pyridine group, piperidine group, thiazole group, furan group, thiophene group, pyrane group, morpholine group, benzothiazole group, pyrrole group, benzopyrrole group, quinoline group or oxazole group or a heteroaromatic group containing a substituent non-reactive with sodium hydride, comprising reacting a carboxylic acid ester of the formula

$$R_1—COOR_3 \quad \text{(II)}$$

in which R_3 is methyl or ethyl, with a carboxylic acid nitrile of the formula

$$R_2—CH—CN \quad \text{(III)}$$

in an inert solvent with sodium hydride, the sodium hydride being added as a 70–80% suspension in white oil.

4,716,238

CHROMENE DERIVATIVES USEFUL AS INSECTICIDES

Tibor Timár; Kálmán Zsupán; János Répási; Irén Borsos née Safranek, all of Tiszavasvári; István Kiss, Szeged; Amdrás Fodor, Szeged, and Péter Maróy, Szeged, all of Hungary, assignors to Alkaloida Vegyeszeti Gyar, Tiszavasvári, Hungary

Filed Feb. 14, 1984, Ser. No. 580,097

Claims priority, application Hungary, Feb. 15, 1983, 504

Int. Cl.[4] C07D *311/58*

U.S. Cl. 549—408 1 Claim

1. 5-methyl-7-cyclopentyloxy-2,2-dimethyl-2H-chromene.

4,716,239

NICKEL COMPOSITION SOLUBLE IN HYDROCARBONS

Gérard Provin, Ezanville; Alain Forestiere, Vernaison, and Dominique Commereuc, Meudon, all of France, assignors to Institut Francais du Petrole, Rueil-Malmaison, France

Filed Nov. 28, 1984, Ser. No. 675,594

Claims priority, application France, Nov. 29, 1983, 83 19183

Int. Cl.[4] C07F *15/04*

U.S. Cl. 556—147 16 Claims

1. A nickel liquid reaction product composition, soluble in hydrocarbons, obtained by the process comprising reacting:

a divalent nickel inorganic compound;

a halogenoacetic acid;

and an ester of the general formula R_1COOR_2, wherein R_1 is hydrogen or C_{1-4}-alkyl and R_2 is a hydrocarbyl radical.

4,716,240

1,2-DICHLORO-1,2,2-TRIMETHYL-1-PHENYLDISILANE AND METHOD FOR PRODUCING THE SAME

Yoichiro Nagai, Yamato; Hamao Watanabe, and Yoshinori Akutsu, both of Kiryu, all of Japan, assignors to Yuki Gosei Kogyo Co., Ltd., Tokyo, Japan

Filed Feb. 6, 1987, Ser. No. 11,964

Claims priority, application Japan, Feb. 19, 1986, 61-32808; Feb. 19, 1986, 61-32809

Int. Cl.[4] C07F *7/08, 7/12*

U.S. Cl. 556—430 11 Claims

1. 1,2-dichloro-1,2,2-trimethyl-1-phenyldisilane expressed by the chemical formula (II),

$$Cl(CH_3)_2SiSi(CH_3)(C_6H_5)Cl.$$

4,716,241

CYCLOPENTANE DERIVATIVES

Takayoshi Yamauchi; Kaneaki Hattori; Shunichi Ikeda, and Kentaro Tamaki, all of Sakai, Japan, assignors to Kyowa Hakko Kogyo Co., Ltd., Tokyo, Japan

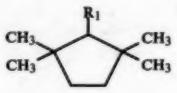
Filed Feb. 28, 1986, Ser. No. 834,945

Claims priority, application Japan, Mar. 1, 1985, 60-40946; Jul. 5, 1985, 60-147821

Int. Cl.[4] C07C *121/46*

U.S. Cl. 558—44 1 Claim

1. A compound represented by the formula



wherein R_1 is cyano, formyl, or alkanesulfonyloxy.

4,716,242

SALTS OF OXAZAPHOSPHORINE DERIVATIVES

Jürgen Engel, Alzenau; Axel Kleemann, Mühlheim; Ulf Niemeyer; Peter Hilgard, both of Bielefeld, and Joerg Pohl, Halle, all of Fed. Rep. of Germany, assignors to Asta-Werke Aktiengesellschaft Chemische Fabrik, Bielefeld, Fed. Rep. of Germany

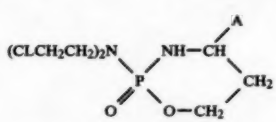
Filed Feb. 22, 1985, Ser. No. 704,465

Claims priority, application Fed. Rep. of Germany, Mar. 1, 1984, 3407585

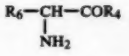
Int. Cl.[4] C07F *9/40*

U.S. Cl. 558—81 7 Claims

1. A salt of oxazaphosphorine derivatives of the formula



where A is the group —S—alk—SO_3H and alk represents a C_2–C_4-alkylene residue with a basic compound of the formula:



II

wherein R_4 is a hydroxy group or an amino group R_6 is hydrogen or a C_1–C_6-alkyl group or a C_1–C_6-alkyl group which is substituted by an amino group or a guanido group.

4,716,243

α-(O-CHLOROPHENYL)-AMINOMETHYLENE-β-FORMYLAMINOPROPIONITRILE

Hansgeorg Ernst, Ludwigshafen; Wolfgang Littmann, Mannheim, and Joachim Paust, Neuhofen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Aug. 15, 1985, Ser. No. 765,505

Claims priority, application Fed. Rep. of Germany, Aug. 25, 1984, 3431270

Int. Cl.⁴ C07C *87/24, 121/16;* C07D *239/42*

U.S. Cl. 558—395 **1 Claim**

1. α-(o-Chlorophenyl)-aminomethylene-β-formylaminopropionitrile.

4,716,244

PROCESS FOR THE PREPARATION OF STERICALLY HINDERED HYDROXYPHENYLCARBOXYLIC ACID ESTERS

Ivan Orban, Basel, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

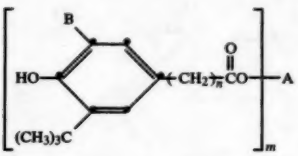
Filed Apr. 21, 1986, Ser. No. 853,839

Claims priority, application Switzerland, May 2, 1985, 1870/85

Int. Cl.⁴ C07C *67/03*

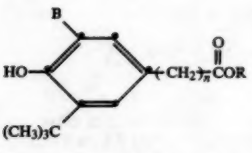
U.S. Cl. 560—75 **6 Claims**

1. A process for the preparation of a compound of formula I



(I)

wherein n is a number from 0 to 2, m is 1 or 2, A is a radical derived from an m-valent aliphatic alcohol, which radical contains 2 to 18 carbon atoms, and B is methyl or tert-butyl, by transesterification of about m moles of an ester of formula II at a temperature of 110° to 220° C. and under a pressure of 1000 to 2 mbar,



(II)

wherein R is methyl or ethyl, with an alcohol of formula III

(III)

which process comprises

(a) carrying out the transesterification in the presence of an organic or inorganic zinc salt in an amount of 0.05 to 2.0 mol%, based on the ester of formula II, and

(b) distilling the resultant melt in a short-time distillation apparatus under a pressure in the range from 0.5 to 6 mbar and at a temperature in the range from 230° to 270° C., and granulating the melt obtained.

4,716,245

PROCESS FOR PRODUCING 2,6-NAPHTHALENEDICARBOXYLIC ACID

Isao Hirose, Matsuyama, Japan, assignor to Teijin Petrochemical Industries, Ltd., Tokyo, Japan

Filed Apr. 18, 1986, Ser. No. 853,693

Claims priority, application Japan, Apr. 24, 1985, 60-86563; Nov. 19, 1985, 60-257800

Int. Cl.⁴ C07C *51/265*

U.S. Cl. 562—416 **17 Claims**

1. A process for producing 2,6-naphthalenedicarboxylic acid which comprises oxidizing 2,6-diisopropylnaphalene or its oxidation derivative with molecular oxygen in a reaction medium containing at least 70% by weight of an aliphatic monocarboxylic acid selected from the group consisting of acetic acid, propionic acid and a mixture of these in the presence of an oxidation catalyst comprising (A) at least one compound of a heavy metal selected from propionic acid and a mixture of these in the presence of an oxidation catalyst comprising (A) at least one compound of a heavy metal selected from the group consisting of compounds of cobalt, compounds of manganese, and mixtures thereof and (B) bromine or a bromine compound; characterized in that said oxidation is carried out in the presence of 1.1 to 15 gram-atoms, per gram-atom of bromine, of an alkali metal.

4,716,246

PROCESS FOR L-DOPA

Donald F. Reinhold, Morganville; Torleif Utne, Warren, and Newton L. Abramson, Edison, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Aug. 22, 1986, Ser. No. 899,283

Int. Cl.⁴ C07C *99/08*

U.S. Cl. 562—446 **3 Claims**

1. A process for producing (S)-3-(3,4-dihydroxyphenyl)alanine which comprises:

(1) hydrolyzing 5-vanillylhydantoin with alkali to obtain 3-(4-hydroxy-3-methoxyphenyl)alanine;

(2) acetylating 3-(4-hydroxy-3-methoxyphenyl)alanine in aqueous alkali to obtain (R,S)-N-acetyl-3-(4-acetoxy-3-methoxyphenyl)alanine;

(3) selectively and independently crystallizing the enantiomorphs, (S)-N-acetyl-3-(4- acetoxy-3-methoxyphenyl)alanine and (R)-N-acetyl-3-(4-acetoxy-3-methoxyphenyl)alanine in a parallel or a series operation;

(4) hydrolyzing (S)-N-acetyl-3-(4-acetoxy-3-methoxyphenyl-)alanine to obtain (S)-3-(3,4-dihydroxyphenyl)alanine; and

(5) racemizing (R)-N-acetyl-3-(4-acetoxy-3-methoxyphenyl-)alanine by warming an acetic acid dispersion thereof with acetic anhydride to obtain (R,S)-N-acetyl-3-(4-acetoxy-3-methoxyphenyl)-alanine; and recycling the (R,S)-N-acetyl-3-(4-acetoxy-3-methoxyphenyl)alanine to Step 3.

4,716,247

PROCESS FOR THE PRODUCTION OF THIOSEMICARBAZIDE

Axel Kleemann; Herbert Klenk, and Wolfgang Schulz, all of Hanau, Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Feb. 1, 1983, Ser. No. 462,973

Claims priority, application Fed. Rep. of Germany, Feb. 6, 1982, 3204149

Int. Cl.⁴ C07C *159/00;* C01B *21/093;* C01C *3/20*

U.S. Cl. 564—18 **13 Claims**

1. A process for forming hydrazine thiocyanate comprising reacting hydrazine with hydrogen cyanide and sulfur.

3. A process of preparing thiosemicarbazide comprising reacting hydrazine with hydrogen cyanide and sulfur to form hydrazine thiocyanate and heating the hydrazine thiocyanate to form thiosemicarbazide.

4,716,248

AMINOCYCLOHEXYL-SUBSTITUTED, BRANCH ALKYLAMINES

Frederick H. Howell, Atherton, England, and Josef Pfeifer, Therwil, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 388,360, Jun. 14, 1982, abandoned. This application Oct. 12, 1984, Ser. No. 660,196

Claims priority, application United Kingdom, Jun. 19, 1981, 8119009

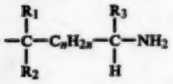
Int. Cl.[1] **C07C** *101/72*

U.S. Cl. 564—454 **12 Claims**

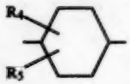
1. A compound having the formula I

$$X\text{—}(YQNH_2)_p \qquad (I)$$

wherein p is 1 or 2 and the residues QNH_2 are the same or different and each is a residue of formula:



wherein n is an integer from 1 to 15; R_1 is C_1–C_8 alkyl; R_2 is C_1–C_4 alkyl; or R_1 and R_2, together with the carbon atom to which they are attached, form a C_5–C_8 cycloalkylene residue; R_3 is H or C_1–C_6 alkyl, C_3–C_8 cycloalkyl or C_6–C_{10} aryl; and Y is a divalent cyclohexylene residue of formula:



wherein R_4 and R_5 are H or C_1–C_4 alkyl or, when p is 1, the group R_4, together with the group X, can form a tetramethylene chain substituted by the group QNH_2, X is NH_2 or QNH_2 or X may be combined with R_4 as hereinbefore defined; and, when p is 2, X is a direct bond or a —CH_2— or —O— residue; as well as salts with organic or inorganic acids; and stereoisomers of formula I.

4,716,249

PROCESS FOR PREPARING NATURAL BENZALDEHYDE AND ACETALDEHYDE

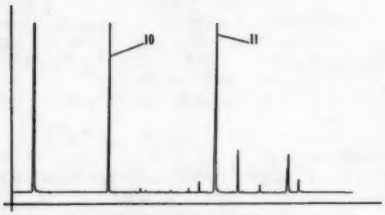
Alan O. Pittet, Atlantic Highlands, N.J., assignor to International Flavors & Fragrances Inc., New York, N.Y.

Continuation of Ser. No. 872,913, Jun. 11, 1986, which is a division of Ser. No. 780,298, Sep. 26, 1985, Pat. No. 4,617,419. This application Oct. 31, 1986, Ser. No. 925,788

The portion of the term of this patent subsequent to Oct. 14, 2003, has been disclaimed.

Int. Cl.[4] **C07C** *45/51*

U.S. Cl. 568—433 **1 Claim**

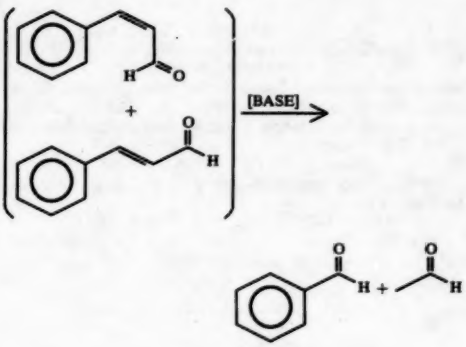


GC-IR SPECTRUM FOR EXAMPLE I

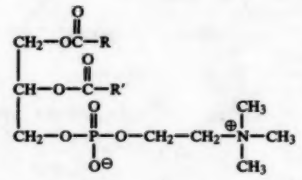
1. A method of making benzaldehyde comprising:

(i) dispersing cinnamaldehyde in water:

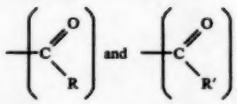
(ii) converting the cinnamaldehyde to benzaldehyde according to the reaction:



under the action of heat at reflux conditions in the presence of a mixture of natural base and in the presence of an ionic surfactant which is lecithin having the structure:



wherein the residues:



represent palmitoyl, stearoyl, oleyl, linoleyl, linolenyl and C_{20}–C_{22} acid residues, the temperature range of the reaction being between 40° C. and 150° C. the pressure range of the reaction being between 0.2 and 10 atmospheres; the time of reaction being between 5 and 80 hours; the mole ratio of base:cinnamaldehyde being from 0.1:1 up to 4:1;

(iii) distilling benzaldehyde and acetaldehyde from the cinnamaldehyde; and

(iv) recovering benzaldehyde from the distillate.

4,716,250

HYDROFORMYLATION USING LOW VOLATILE/ORGANIC SOLUBLE PHOSPHINE LIGANDS

Anthony G. Abatjoglou, Charleston, and David R. Bryant, South Charleston, both of W. Va., assignors to Union Carbide Corporation, Danbury, Conn.

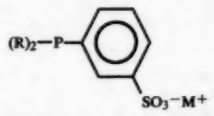
Filed Jul. 10, 1986, Ser. No. 884,197

Int. Cl.[4] **C07C** *45/50*

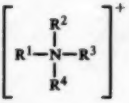
U.S. Cl. 568—454 **19 Claims**

1. In a non-aqueous hydroformylation process for producing aldehydes which comprises reacting an olefinically unsaturated organic compound with carbon monoxide and hydrogen, in a non-aqueous hydroformylation reaction medium containing an organic solubilized Group VIII transition metal-phos-

phorus ligand complex catalyst and free phosphorus ligand, wherein the hydroformylation reaction conditions comprise a reaction temperature of from about 45° C. to about 200° C., a total gas pressure of hydrogen, carbon monoxide and olefinically unsaturated compound of less than about 1500 psia; wherein the H_2:CO molar ratio of gaseous hydrogen to carbon monoxide is in the range of from about 1:10 to 100:1; and wherein said reaction medium contains at least about 4 moles of total free phosphorus ligand per mole of Group VIII transition metal in said medium, the improvement comprising employing as the phosphorus ligand of said complex catalyst and as said free phosphorus ligand, a low volatile, organic soluble monosulfonated tertiary phosphine salt the general formula



wherein each R group individually represents a radical containing from 1 to 30 carbon atoms selected from the class consisting of alkyl, aryl, alkaryl, aralkyl and cycloalkyl radicals and M represents an amine cation having the general formula



wherein R^1 represents hydrogen or a radical containing from 1 to 30 carbon atoms selected from the class consisting of alkyl, aryl, alkaryl, aralkyl, and cycloalkyl radicals, and each R^2, R^3 and R^4 group individually represents a radical selected from the class consisting of alkyl, aryl, alkaryl, aralkyl and cyclohexyl radicals, and wherein any two or three of said R^1, R^2, R^3 and R^4 groups can be bonded together to form a mono-, bi-, or poly-cyclic ring along with the nitrogen atom of said amine cation; with the proviso that in any given monosulfonated tertiary phosphine salt employed at least one of said R^1, R^2, R^3 and R^4 groups of the amine cation, M, represents an alkyl or aralkyl radical containing from 8 to 30 carbon atoms.

4,716,251

DIARYLOXYALKANE BROMINATION PROCESS

Gerald L. Scymanski, Trenton; Amgad S. Mossaad, South River, and Saadat Hussain, East Brunswick, all of N.J., assignors to Ethyl Corporation, Richmond, Va.

Filed Feb. 7, 1986, Ser. No. 826,994

Int. Cl.[4] C07C *41/18, 43/225*

U.S. Cl. 568—645 **19 Claims**

1. A process for brominating a diaryloxyalkane to produce a product containing an average of about 5–7 bromine atoms per molecule, said process comprising;

(a) commingling a solution of said diaryloxyalkane in a haloalkane solvent with an excess of liquid bromine in the absence of a bromination catalyst at a temperature from about 0° C. up to the reflux temperature of the mixture;

(b) allowing the resultant mixture to react to form the desired brominated diaryloxyalkane; and

(c) recovering said brominated diaryloxyalkane.

4,716,252

PROCESS FOR THE PREPARATION OF BIS-HYDROXYPHENYL-N-ALKANES, NEW BIS-HYDROXYPHENYL-N-ALKANES AND NEW ALKANEDIONES

Rudolf Wagner, Cologne; Kurt Halcour, Leverkusen; Hans-Rudolf Dicke, and Volker Eckhardt, both of Krefeld, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

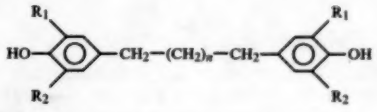
Filed Jul. 28, 1986, Ser. No. 891,491

Claims priority, application Fed. Rep. of Germany, Aug. 2, 1985, 3527862

Int. Cl.[4] C07C *39/16, 37/00*

U.S. Cl. 568—729 **5 Claims**

1. A process for the preparation of a bis-hydroxyphenyl-n-alkane of the formula (I)



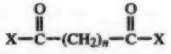
(I)

in which

n represents an integer in the range from 0 to 10, and

R_1 and R_2, independently of one another, represent hydrogen, C_1- to C_{12}-alkyl, C_1- to C_4-alkoxy and/or halogen,

wherein 1 mol of a dicarboxylic acid or dicarboxylic acid derivative of the formula (II)



(II)

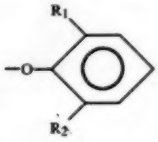
in which

n has the abovementioned meaning, and

X represents

(a) OH or halogen, or both X's form, together with the molecular moiety —CO—$(CH_2)_n$—CO—, the corresponding cyclic or polymeric dicarboxylic anhydride, or represents

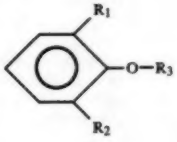
(b) the radical (III)



(III)

in which

R_1 and R_2 have the abovementioned meaning, is contacted with 1 to 10 mols of a fluorine-containing organic sulphonic acids, with the addition, in the case where X=(a), of a phenolic compound of the formula (IV)



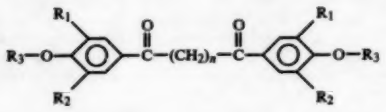
(IV)

in which

R_1 and R_2 have the abovementioned meaning, and

R_3 represents hydrogen or C_1- to C_{12}-alkyl, at temperatures in the range from 20° to 120° C., pressures in the range from 0.5 to 5 bar and holdup times in the range from 1

minute to 2 hours to form an alkanedione of the formula (V)



(V)

in which

n, R_1, R_2 and R_3 have the abovementioned meaning, which is converted by hydrogenation, and in the case where R_3=C_1- to C_{12}-alkyl by an additional ether cleavage, into a bis-hydroxyphenyl-n-alkanes.

4,716,253

METHOD FOR PRODUCING CYCLOALKANOLS

Tamio Shirafuji; Kiyomi Sakai, both of Niihama, and Ken-ichi Hirose, Settsu, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Nov. 12, 1986, Ser. No. 929,510

Claims priority, application Japan, Nov. 19, 1985, 60-259479; Nov. 25, 1985, 60-265904

Int. Cl.[4] C07C *29/04, 35/18*

U.S. Cl. 568—895 **11 Claims**

1. A method for producing a cycloalkanol having from 5 to 8 carbon atoms by the hydration of a cycloalkene having from 5 to 8 carbon atoms with water using a solid acid as a catalyst which comprises carrying out said hydration at a temperature in the range from about 50° C. to about 200° C. in the presence of a phenol having one or more hydroxyl groups directly bonded to a benzene ring.

4,716,254

PREPARATION OF AROMATIC IODINE COMPOUNDS

Raymond L. Cobb, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jul. 7, 1986, Ser. No. 882,575

Int. Cl.[4] C07C *17/12*

U.S. Cl. 570—147 **14 Claims**

1. An iodination process comprising the step of contacting

(a) a feed stream comprising at least one monohalobenzene compound with

(b) an iodination reagent selected from the group consisting of (i) iodine monochloride (ii) mixtures of free iodine and free chloride having an I_2:Cl_2 mol ratio in the range of from about 1:3 to about 3:1, and

(c) a catalyst composition comprising at least one material selected from the group consisting of lanthanide chlorides, mixtures of iron(III) chloride with cerium chloride and mixtures of iron(III) chloride with samarium chloride;

under such iodination conditions as to obtain a product comprising at least one para-iodohalobenzene compound;

wherein the weight ratio of iron(III) chloride to cerium chloride in said mixtures of iron(III) chloride with cerium chloride is in the range of from about 1:10 to about 20:1, and the weight ratio of iron(III) chloride to samarium chloride in said mixtures of iron(III) chloride with samarium chloride is in the range of from about 1:10 to about 20:1.

4,716,255

PROCESS FOR THE PRODUCTION OF 3,3-DICHLORO-2-METHYLPROPENE

Dieter J. Müller, Marl, Fed. Rep. of Germany, assignor to Huels Aktiengesellschaft, Marl, Fed. Rep. of Germany

Filed Aug. 27, 1984, Ser. No. 644,418

Claims priority, application Fed. Rep. of Germany, Aug. 25, 1983, 3330610; Apr. 25, 1984, 3415337

Int. Cl.[4] C07C *17/06*

U.S. Cl. 570—216 **17 Claims**

1. A process for the production of 3,3-dichloro-2-methylpropene as predominant product, comprising reacting 1-chloro-2-methylpropene with sulfuryl chloride in the presence of an effective amount of a compatible and nitrogen-containing organic base having a catalytically effective free pair of electrons or phosphine.

4,716,256

HYDROGENATION OF DIENES

Marvin M. Johnson, and Gerhard P. Nowack, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jan. 31, 1985, Ser. No. 696,971

Int. Cl.[4] C07C *5/02*

U.S. Cl. 585—274 **9 Claims**

1. A process for the selective hydrogenation of 4-vinylcyclohexene to 4-ethylcyclohexene which comprises contacting said 4-vinylcyclohexene under hydrogenation conditions in the presence of hydrogen, a catalyst consisting essentially of elemental nickel on an inorganic support, and at least one nitrogen-containing compound; wherein said at least one nitrogen-containing compound is selected from the group consisting of:

pyridine,
2-methylpyridine,
4-methylpyridine,
quinoline,
isoquinoline,
hydrazine,
ethylene diamine,
hexamethylene diamine,
NR_3,

wherein each R is independently H, a C_1 up to about C_{10} alkyl or a C_5 up to about C_{10} cycloakyl or aromatic radical; and mixtures of any two or more thereof; and within the amount of said at least one nitrogen-containing compound ranges from about 0.01 up to 5 mole percent based on the moles of said 4-vinylcyclohexene.

4,716,257

ORGANOLANTHANIDE CATALYSTS

Tobin J. Marks, and Heiko Mauermann, both of Evanston, Ill., assignors to Northwestern University, Evanston, Ill.

Division of Ser. No. 715,927, Mar. 25, 1985, Pat. No. 4,668,773. This application May 14, 1987, Ser. No. 29,186

Int. Cl.[4] C07C *5/03*

U.S. Cl. 585—275 **6 Claims**

1. A method for hydrogenating olefins comprising the steps of

(a) filling an evacuated reaction vessel with a measured volume of solvent;

(b) preparing a substantially pure hydrogen atmosphere in said reaction vessel and over said solvent;

(c) adding measured amounts of a catalyst and an olefin, said catalyst including a lanthanide complex of the formula $(Cp_2'MH)_2$, where $Cp'=(\eta^5(CH_3)_5C_5)$ and M is selected from the group consisting of the Lanthanide Series elements; and

(d) mixing;

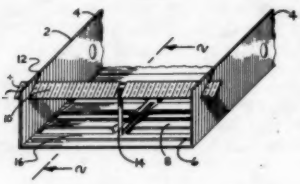
whereby said olefin is hydrogenated.

4,716,258

STAMPED CONCENTRATORS SUPPORTING PHOTOVOLTAIC ASSEMBLIES

R. Michael Murtha, 1010 Janetwood Dr., Oxnard, Calif. 93030

Filed Jan. 23, 1987, Ser. No. 6,373
Int. Cl.[4] H02N 6/00
U.S. Cl. 136—246 4 Claims



1. A radiant energy concentrating collector comprising:

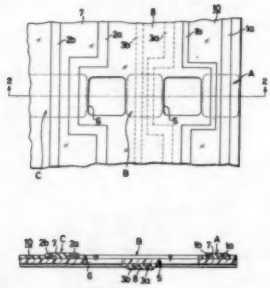
reflective sheet material formed as a module and having stamped louvers therein with open spaces therebetween and connected by common-border-areas, said common-border-areas including rib means, said rib means supporting a photovoltaic cell assembly, the louvers being positioned to reflect sunlight falling on the module to said photovoltaic cell assembly.

4,716,259

BOTH-SIDE FLEXIBLE PRINTED CIRCUIT BOARD

Go Tokura, Kanagawa; Kazuhiko Arakawa, Tokyo, and Jun Terashima, Kanagawa, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 23, 1986, Ser. No. 821,606
Claims priority, application Japan, Feb. 1, 1985, 60-013096[U]
Int. Cl.[4] H05K 1/00
U.S. Cl. 174—68.5 6 Claims



1. A two-sided flexible printed circuit board, including a substrate having electrically conducting patterns and cover layers formed on both sides, comprising:

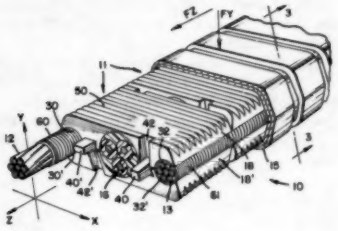
apertures formed in a curved portion of said printed circuit board, surface portions of said curved portion having said conducting patterns formed only on the front surface or back surface so that the conducting patterns are not superimposed one over the other in said curved portion, and said cover layers being formed only on the conducting pattern side at the surface portion of said curved portion of said board in said curved portion.

4,716,260

PUSHING AND PULLING CABLE

Ernest G. Hoffman, Middlefield, and David H. Neuroth, Hamden, both of Conn., assignors to Hubbell Incorporated, Orange, Conn.

Filed Aug. 13, 1986, Ser. No. 896,011
Int. Cl.[4] H01B 7/18
U.S. Cl. 174—102 R 25 Claims



1. An elongated cable structure having a longitudinal axis and comprising:

an outer layer extending substantially parallel to the longitudinal axis of the cable structure and defining an elongated internal cavity, said outer layer being substantially rigid in longitudinal and transverse directions for receiving longitudinal and transverse components of driving forces when applied to the cable structure and being bendable about said longitudinal axis;

at least one elongated tensile element in said cavity having its longitudinal axis extending substantially parallel to said longitudinal axis of said cable structure and being bendable about said longitudinal axis of said cable structure for pulling and pushing the cable substantially longitudinally;

a plurality of longitudinally disposed gripping members positioned in said cavity between said outer layer and said tensile element; and

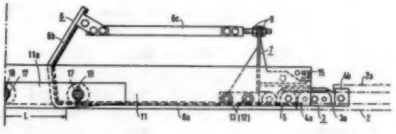
means coupling said gripping members to said outer layer in a region where said transverse components of driving forces are to be applied to said layer, whereby said members are drive-coupled to said layer, said members substantially enclosing and transversely compressing longitudinal segments of said tensile element to grip and to increase the longitudinal rigidity of such segments, whereby transfer of the driving forces from said outer layer to said tensile element pushing and pulling forces is effected.

4,716,261

SECTION INSULATOR FOR ELECTRIC RAILWAY CONTACT CONDUCTORS

Helmut Wehrberger, Roettenbach, and Ulrich Summa, Bubenreuth, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed May 23, 1986, Ser. No. 867,103
Claims priority, application Fed. Rep. of Germany, Jun. 7, 1985, 8516717[U]
Int. Cl.[4] B60M 1/18
U.S. Cl. 191—39 6 Claims



1. A section insulator for electric railway contact conductors having the ends of two contact conductors each secured to

a first upright insulation strip and a second upright insulation strip by means of a respective contact conductor terminal clamp and a respective support member; the insulation strips are constructed of fiber-reinforced plastic; two arc horns with an approximate U-shape attached between the two insulation strips to the support members, one leg of each arc horn forming a runner which is contacted by an electric railway current collector, and the other leg of each arc horn forming an adjustment bracket connected back to its respective support member; and a contact runner portion of each arc horn connecting the two legs forming an approximately V-shaped arc guide, the improvement comprising:

a first upright contact bar and a second upright contact bar for providing a contact surface for the current collector at the space between the runners of the arc horns, wherein the first upright contact bar is connected to the first upright insulation strip and the second upright contact bar is connected to the second upright insulation strip; and

a plurality of spacers for separating the upright contact bars from the upright insulator strips;

the bottom side of each upright insulation strip located above the contact surface for the current collector.

4,716,262

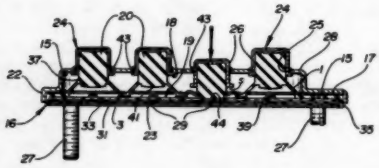
VANDAL-RESISTANT TELEPHONE KEYPAD SWITCH

Milton Morse, Fort Lee, N.J., assignor to Nena Morse, Fort Lee, N.J.

Continuation-in-part of Ser. No. 544,391, Oct. 21, 1983, Pat. No. 4,555,600, and a continuation-in-part of Ser. No. 381,905, May 25, 1982, Pat. No. 4,501,936, and a continuation-in-part of Ser. No. 299,509, Sep. 4, 1981, Pat. No. 4,436,965, and a continuation-in-part of Ser. No. 286,063, Jul. 23, 1981, abandoned, and a continuation-in-part of Ser. No. 261,647, May 7, 1981, abandoned, and a continuation-in-part of Ser. No. 236,757, Feb. 23, 1981, Pat. No. 4,438,300. This application Nov. 22, 1985, Ser. No. 801,136

Int. Cl.[4] H01H *13/70*

U.S. Cl. 200—5 A **15 Claims**



1. A switch assembly comprising:

a pressure-actuated switch including a rigid support plate; a base layer of flexible material having a front face formed with an array of electrically-conductive paths thereon connected to said support plate;

an intermediate layer formed on said base layer having apertures therethrough overlying portions of said electrically-conductive paths of said base layer;

a top layer formed on said intermediate layer having electrically-conductive paths thereon a portion of said paths overlying said apertures in said intermediate layer;

a continuous flexible membrane overlying said top layer and sealing said top layer and said plate and formed with a relatively thick projecting portion at each aperture in said intermediate layer;

each of said projecting portions being connected to said membrane via a conical support surface;

a rigid shield connected to said switch and formed with an array of throughgoing apertures aligned with and generally identical to those of the intermediate layer and having a rear face confronting the sealing portion of said membrane, the thick projecting portions of the membrane projecting forward through the apertures of the shield plate past the front face thereof;

means for securing the shield plate to the membrane with the apertures aligned; and respective rigid caps fitted over the thickened portions, projeccting forward through the shield plate apertures.

4,716,263

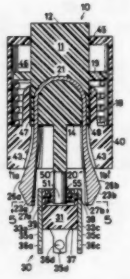
RECIPROCALLY ACTUATED SWITCH WITH ROTATABLE CONTACT SELECTOR

Karel Havel, P.O. Box 66, Station M, Toronto, Ontario, Canada M6S 4T2

Continuation-in-part of Ser. No. 901,878, Aug. 29, 1986, abandoned, which is a continuation-in-part of Ser. No. 852,768, Apr. 16, 1986, abandoned, which is a continuation-in-part of Ser. No. 844,690, Mar. 27, 1986, abandoned. This application Jun. 24, 1987, Ser. No. 65,901

Int. Cl.[4] H01H *19/00, 21/00, 25/06*

U.S. Cl. 200—11 R **6 Claims**



1. A rotary switch comprising:

a stationary member including an insulating body having a plurality of stationary contact pairs angularly arranged thereon;

a rotary member including a rotary body and a flexible conducting bridging element secured thereto;

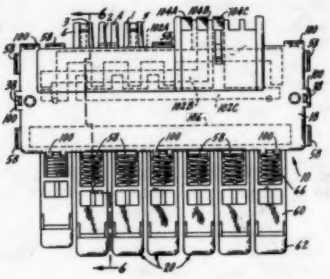
said rotary body being coupled to said stationary member for rotating about an axis to bring said bridging element to one of a plurality of angular rotary positions aligned with a selective one of said contact pairs; and

a slider member arranged on said rotary member for reciprocating movement along said axis to an engaging position, for deflecting said bridging element into electrical engagement with the aligned contact pair on said stationary member, and to a disengaging position, for releasing said bridging element from said aligned contact pair.

4,716,264
VACUUM SWITCH

Charles P. Toulouse, Winona, Minn., assignor to Lake Center Industries, Winona, Minn.

Filed Mar. 11, 1987, Ser. No. 24,628
Int. Cl.[4] H01H *9/06*
U.S. Cl. 200—61.86 **27 Claims**



1. A vacuum switch for connecting a plurality of vacuum lines in variable combinations, comprising:

a vacuum housing including a plurality of ports connectable to the vacuum lines, and a plate member having on one side a plurality of separate channels, at least two of the channels being in fluid communication with separate ports, each channel having at least one passage therein extending through the plate member;

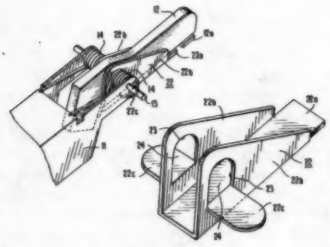
seal means for sealing the channels sufficiently to maintain a vacuum in them;

a plurality of valves slidably engaging, in sealing relation, the surface of the other side of the plate member, each valve having a cavity in its central portion adjacent the surface of the plate to provide fluid communication between two channels when the valve is placed such that the cavity spans a pair of passages.

4,716,265
CIRCUIT BREAKER WITH ARC SHIELDED CONTACT ARM

Hiroshi Fujii; Tsukasa Iio; Yasusi Genba; Hideaki Moriwaki, and Yoshinori Mochizuki, all of Fukuyama, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 15, 1987, Ser. No. 61,522
Claims priority, application Japan, Sep. 9, 1986, 61-138778[U]
Int. Cl.[4] H01H *33/08, 9/30*
U.S. Cl. 200—144 R **4 Claims**



1. A circuit breaker, comprising:

(a) a stationary contact arm (2) having a stationary contact (2*a*);

(b) a movable contact arm (12) having a movable contact (12*a*) for engaging with and separating from the stationary contact to close and open a current flow path;

(c) a contact mounting arm (11) for rotatably supporting the movable contact arm about a shaft (13);

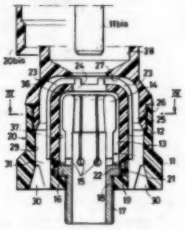
(d) contact-pressure spring means (14) disposed on the shaft for biasing the movable contact arm toward the stationary contact arm; and

(e) an electrically insulating shield (22) disposed on the shaft, underlying a bottom face of the movable contact arm, overlying opposite side faces thereof, and underlying the contact-pressure spring means to prevent a contact separation arc from migrating along the movable contact arm and/or welding any turns of the spring means together.

4,716,266
ELECTRICAL ARC QUENCHING CHAMBER, IN PARTICULAR FOR FLUID-QUENCHED CIRCUIT BREAKERS

Giuseppe Muscaglione, Pontirolo Nuovo, and Gianpietro Talpo, Bergamo, both of Italy, assignors to SACE S.p.A. Costruzioni Elettromeccaniche, Milan, Italy

Filed Oct. 15, 1986, Ser. No. 918,879
Claims priority, application Italy, Dec. 3, 1985, 23074 A/85
Int. Cl.[4] H01H *33/70*
U.S. Cl. 200—148 R **20 Claims**

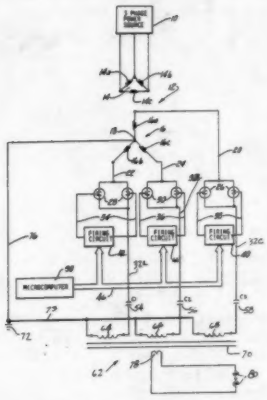


1. An electric arc interruption chamber particularly adapted for use with fluid-quenched circuit breakers having an arc-quenching gas within a sealed electrically insulated casing comprising a movable main contact and a stationary main contact each having a respective arc contact, said movable arc contact being a tulip contact defined by a plurality of spaced fingers, a generally bell-shaped member constructed of electrically insulated material, said bell-shaped member being defined by a peripheral wall and an end wall, said end wall having an opening in alignment with and through which relatively moves said stationary arc contact, an exterior of said fingers and an interior of said bell-shaped member defining a first chamber, said movable main contact having a housing constructed of electrically insulating material; said housing being defined by a peripheral wall and an end wall in external space relationship to said bell-shaped member peripheral wall and end wall, respectively, and defining therewith a second chamber; said housing end wall having an opening in alignment with and through which relatively moves said stationary arc contact; means cooperatively defined by an exterior of said bell-shaped member and an interior of said housing for forming arc-quenching gas flow zones in said second chamber for directing arc-quenching gas along said second chamber toward said opening, into said first chamber and into said tulip contact; and said arc-quenching gas flow zones include both low speed/low pressure zones and high speed/high pressure zones.

4,716,267
THREE PHASE HIGH FREQUENCY SPIKE WELDING SYSTEM

Roger G. Reynolds, Pontiac, Mich., assignor to Weldex, Inc., Warren, Mich.

Continuation-in-part of Ser. No. 582,326, Feb. 22, 1984, abandoned. This application Jul. 2, 1985, Ser. No. 751,334
Int. Cl.[4] B23K *11/26*
U.S. Cl. 219—113 3 Claims



1. User-programmable electrical resistance welding apparatus of the type employing a three-phase alternating source of electrical power for producing pulses of electrical current and electrode means for delivering said current pulses to a workpiece to be welded, comprising:

three pulse-forming circuits respectively associated with the three phases of said alternating source of electrical power and each operative to produce a pulse of electrical current during any half cycle of the corresponding phase of said electrical power source, each of said pulse-forming circuits including a capacitor for converting each half cycle of electrical power of the corresponding phase into one of said electrical current pulses and an electrically controllable switch means for selectively connecting the corresponding phase of said power source with said capacitor;

control means for independently and selectively controlling the operation of each of said pulse-forming circuits such that the electrical current pulses delivered to said workpiece are produced by one or more of said pulse-forming circuits selected by said control means, the timing between electrical current pulses delivered to said workpliece being related to the identity of the one or more pulse-forming circuits selected by said control means, said control means including

(1) three firing circuits for respectively controlling said electrically controllable switch means,

(2) a memory for storing programmed data therein,

(3) manually operable programming means for entering said data into said memory, said data representing user-selected phases of said electrical power source and user-selected timing between the electrical current pulses of the half cycles of the user-selected phases,

(4) a processor connected with said memory and said firing circuits for controlling said firing circuits in accordance with said programmed data, whereby said pulse-forming circuits produce electrical current pulses having said user-selected timing using said user-selected phases;

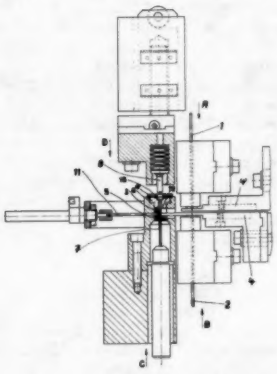
a welding transformer coupled between said pulse-forming circuits and said electrode means for delivering said electrical current pulses from said pulse-forming circuits to said electrode means; and

a three-phase transformer connected between said electrical power source and said pulse-forming circuits, said three-phase transformer including three secondary coil windings connected in a wye configuration having a common terminal, said coil windings being respectively connected with said pulse-forming circuits for delivering a corresponding phase of electrical power from said power source to the respective pulse-forming circuit, said common terminal being connected to ground such that each of said pulse-forming circuits are connected to said ground through the corresponding coil winding, whereby the electrical power applied to said welding transformer from said three-phase transformer through said pulse-forming circuits remains balanced when only certain of said pulse-forming circuits are selected to deliver said electrical current pulses to said welding transformer.

4,716,268
METHOD AND APPARATUS FOR PRODUCING BIMETALLIC CONTACTS, ESPECIALLY BIMETALLIC WELDED CONTACTS

Hans Wacker, Heidelberg, Fed. Rep. of Germany, assignor to Renz, Wacker & Co. Maschinenfabrik, Wildbad im Schwarzwald, Fed. Rep. of Germany

Filed May 22, 1981, Ser. No. 266,512
Claims priority, application Fed. Rep. of Germany, May 27, 1980, 3020144
Int. Cl.[4] B23K *11/16*
U.S. Cl. 219—118 3 Claims



1. Apparatus for making bimetallic button contacts, particularly bimetallic welding contacts by butt-welding metal wires having different electrical conductivity to one another by eletrical resistance welding at a connecting point without noticeable deformation of the connecting point, comprising: a welding and severing station to butt-weld wires brought in contact with their end faces to produce bimetallic pins by shearing off wire components at both sides of the connecting point, a pre-upsetting station for forming the bimetallic pins into blanks; a finish-upsetting station to form the blanks to final bimetallic contacts; means for engaging the bimetallic pins in said welding and severing station after the shearing-off of the wire components and for subsequent supply to said pre-upsetting station under maintenance of a position predetermined by said welding and severing station; means for transferring the blanks into said finish-upsetting station under maintenance of a position in which said blanks come from the pre-upsetting station; supply devices operating in time with one another as well as with the welding and severing station and with forming tools of the upsetting stations; said upsetting stations each comprising an upsetting matrix with a central recess, a form stamp insertable into said recess during the upsetting operation, and an upsetting needle, the upsetting needles being axially movably received in guide bores extending coaxially to form

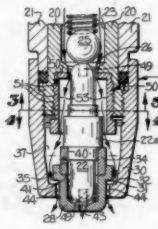
stamps through the upsetting matrices; a guide rail located at the side of the upsetting matrix facing toward the form stamps or supply means for transferring blanks from said pre-upsetting station to said finish upsetting station, said guide rail having through bores registering with recesses in the upsetting matrices, during upsetting said form stamps engaging tools received in the recesses by said bores, said guide rail being movable to and fro in strokes corresponding to the distance between the upsetting stations so that during each movement in direction towards the finish-upsetting matrix a blank lifted out of a recess of the pre-upsetting matrix is taken along in a bore penetrated during upsetting by the pre-upsetting form stamp via a recess of the finish-upsetting matrix and thereby enters into the same.

4,716,269

PLASMA ARC TORCH HAVING SUPPLEMENTAL ELECTRODE COOLING MECHANISMS

Donald W. Carkhuff, Florence, S.C., assignor to L-TEC Company, Florence, S.C.

Filed Oct. 1, 1986, Ser. No. 913,989
Int. Cl.[4] B23K *9/00*
U.S. Cl. 219—121 PQ **6 Claims**



1. In a plasma arc torch having a torch head, a generally elongate solid electrode removably insertable in said torch head, current supply means adapted to be connected to a main power supply for supplying an electrical current to said torch head, gas flow means adapted to be connected to a source of gas for providing a flow of gas through said torch head to supply a plasma arc creasted by said torch and to contact the outside surface of a lower portion of said electrode for partial cooling of said electrode, current transfer assembly means in said torch head for receiving and seating therewithin at least an upper portion of said electrode against upward movement in said torch head and operatively connected to said current supply means for transferring current to sid electrode, nozzle assembly means for receiving and seating the lower portion of said electrode against downward movement in said torch head and operatively connected with said gas flow means for issuing a plasma arc outwardly from said torch head; the improvement therein of supplemental electrode cooling means comprising

passageways which form a part of said gas flow means in said torch head and being defined by said electrode and said current transfer assembly means for circulating the flowing gas through said current transfer assembly means in direct contact with a significant portion of the entire longitudinal extent of the outside surface of said upper portion of said electrode received within said current transfer assembly means for additional cooling of the electrode to increase the life thereof, while maintaining desired seating of said electrode in said current transfer assembly means and transfer of current to said electrode for said current transfer assembly means; and

a hollow member insertable in and forming a part of said current transfer assembly means and being formed of electrically conductive material for transferring current from said current transfer assembly means to said electrode and defining therewithin a portion of said passageways which are generally U-shaped in transverse cross-section and which extend longitudinally of the electrode along the entire longitudinal extent of the surface of said upper portion of said electrode within said current transfer assembly means for receiving the flowing gas therein for circulation over the surface of said electrode.

4,716,270

NON-CONTACT SCRIBING PROCESS FOR ORGANIC MASKANTS ON METALS OR ALLOYS THEREOF

Daniel S. Gnanamuthu; Ralph J. Moores, both of Newbury Park; Neil E. Paton, Thousand Oaks, all of Calif., and Richard F. Vyhna, Tulsa, Okla., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Nov. 4, 1985, Ser. No. 795,003
Int. Cl.[4] B23K *26/00*
U.S. Cl. 219—121 LM **19 Claims**

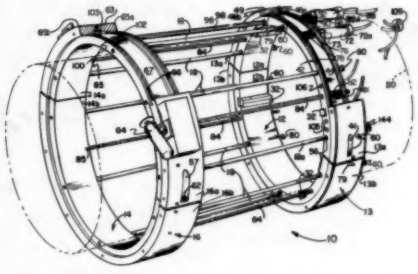
1. A method for scribing chemical milling maskant applied to a metal substrate which comprises impinging a laser beam on an organic maskant applied to said metal substrate, said organic maskant having a predetermined thickness and possessing adsorption to a laser beam, controlling the intensity and time duration of the beam to penetrate through the entire thickness of the maskant but substantially without damaging the underlying metal substrate to scribe a pattern in said maskant, and physically removing the maskant portion within the circumscribed boundary of said pattern, the laser power and scribing speed of the beam being also controlled to ensure adhesion of the remaining maskant to the substrate.

4,716,271

APPARATUS FOR POSITIONING A TOOL WITH RESPECT TO A CYLINDRICAL WORK PIECE

Philip N. Hulsizer, and John H. Dahl, both of Atlanta, Ga., assignors to Welding Services, Inc., Atlanta, Ga.

Filed Sep. 28, 1984, Ser. No. 655,946
Int. Cl.[4] B23K *9/225*
U.S. Cl. 219—125.11 **8 Claims**



2. An apparatus for positioning a tool with respect to an elongate cylindrical workpiece, comprising:

a selectively positionable first annular member for mounting to the outer surface of a workpiece;

a longitudinally moveable second annular member fitted around the workpiece;

means operably associated with said first member for supporting said second member for translational movement longitudinally with respect to the workpiece;

a third annular member fitted around said second member and mounted on said second member for orbital movement with respect thereto; and

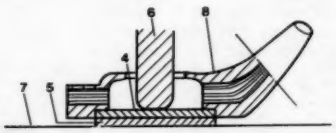
means on said orbitally moveable third member for mounting the tool,

whereby said tool is longitudinally and circumferentially moveable with respect to the workpiece.

4,716,272
METHOD OF ATTACHING A CONNECTION PIECE TO A METAL SURFACE BY BRAZING

Per A. Blad, Stockholm, and Rolf Johansson, Åkersberga, both of Sweden, assignors to AGA Aktiebolag, Lidingo, Sweden

Filed Jul. 19, 1985, Ser. No. 756,631
Claims priority, application Sweden, Aug. 10, 1984, 8404050
Int. Cl.[4] B23K 1/10
U.S. Cl. 219—129 10 Claims

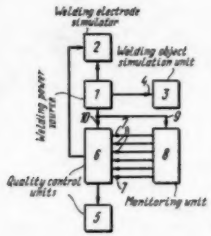


1. A method of connecting a connection piece of metal to a base metal surface by brazing, comprising the steps of:
providing heat generated by an electric arc from a consumable electrode;
conducting said heat through at least a portion of said connection piece,
causing melting of a brazing metal provided between said connection piece and said base metal surface,
applying a mechanical force to said portion of said connection piece after current to the electric arc has been disconnected,
pressing said connection piece against said base metal surface, and
wherein said portion of said connection piece prevents the electric arc from direct contact with said base metal surface and said brazing metal, thereby preventing disadvantageous thermal actuation of said base metal surface.

4,716,273
ELECTRIC-ARC TRAINER FOR WELDERS

Boris E. Paton; Vsevolod V. Vasiliev; Valentin A. Bogdanovsky; Sergei N. Danilyak; Viktor M. Gavva; Jury P. Rolko, and Valery A. Nushko, all of Kiev, U.S.S.R., assignors to Institute Problem Modelirovania V Energetike Akademii Nauk Ukrainskoi SSR, Kiev, U.S.S.R.

Filed Dec. 30, 1986, Ser. No. 947,886
Claims priority, application U.S.S.R., Dec. 30, 1985, 400057[I]
Int. Cl.[4] B23K 9/10
U.S. Cl. 219—130.01 10 Claims

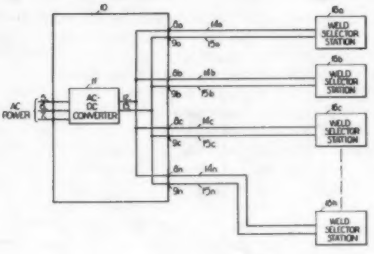


1. An electric-arc trainer for welders, said electric-arc trainer comprising:
a welding electrode simulator having a first input to which a supply voltage is applied, and a second input to which a signal is applied to control a simulated electrode-melting rate depending on a running length of an arc gap;
a welding power source having a first output connected to said first input of said simulator for applying the supply voltage to said simulator, a second output for ensuring together with said first output that welding current is running, and a third output at which a signal is produced to indicate the current arc gap length;
a welding object simulation unit having an input connected to said second output of said welding power source;
said welding electrode simulator interacting with said welding object simulation unit to produce a welding arc;
a control unit having a first input, a second input, a first output, and a second output;
said control unit producing sound signals received by the trainee to indicate if the simulated welding process is being run normally and counting the factors selected from a group including the number of errors made by the trainee, the operating time of the simulated welding process, the total time of the simulated welding process, the time of the simulated welding process without errors, and the weld-on time of the welding electrode simulator, and indicating at least one of said factors;
said first input of said control unit being connected to said third output of said welding power source;
said first output of said control unit being connected to said second input of said welding electrode simulator, and at which the signal is formed to control the simulated electrode-melting rate, depending on the running length of the arc gap;
a unit monitoring parameters of the welding process, having an input to which the signal of the current arc gap length is applied, said input being connected to said third output of said welding power source and an output connected to said second input of said control input, at which output the signals are formed to correspond to the values of respective parameters of the simulated welding process;
a helmet connected to said second output of said control unit at which signals are formed to provide feedback sound signals to inform the trainee if the welding process is correct.

4,716,274
DISTRIBUTED STATION WELDING SYSTEM

Malcolm T. Gilliland, 310 Pine Valley Rd., Marietta, Ga. 30067

Filed Oct. 25, 1985, Ser. No. 791,224
Int. Cl.[4] B23K 9/10
U.S. Cl. 219—130.21 22 Claims



2. An improved welding power supply, comprising:
power supply means for providing a source of DC power; and
weld parameter selection means for providing welding power with electrical parameters desirable for a predetermined welding operation, said weld parameter selection means comprising:
a power input terminal;
input voltage sensing means responsive to an input voltage present at said power input terminal for providing an input voltage signal;
current limiting means;
first switching means responsive to a first drive signal for providing said welding power through said current limit-

ing means to an output terminal, said welding power comprising an output voltage and an output current;

arc sustaining means connected in parallel with said first switching means for providing a predetermined minimum welding power, said predetermined minimum welding power being capable of sustaining an arc;

driving means responsive to a second drive signal and a shutdown signal for selectably providing said first drive signal having a first set of electrical parameters to said first switching means;

feedback current sensing means for providing a current feedback signal responsive to said output current;

first oscillation means for providing said second drive signal, said second drive signal having a second set of electrical parameters, at least one of said second set of electrical parameters being responsive to said input voltage signal and a selected one of the following signals; said current feedback signal, a first manually adjustable signal, and both said current feedback signal and said first manually adjustable signal;

average current sensing means for providing said shutdown signal in response to the average value of said output current exceeding a predetermined maximum average output current value;

peak current sensing means for providing said shutdown signal in response to the peak value of said output current exceeding a predetermined maximum peak output current value; and

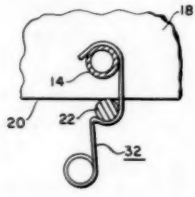
first output voltage sensing means for providing said shutdown signal in response to said output voltage being below a predetermined minimum voltage, said predetermined minimum voltage being less than an arc sustaining voltage required to sustain an arc.

4,716,275

EVAPORATOR COIL HEAT EXCHANGER ASSEMBLY

William L. Waldschmidt, Farmington, Minn., assignor to Thermo King Corporation, Minneapolis, Minn.

Filed Nov. 13, 1986, Ser. No. 930,198
Int. Cl.[4] H05B *1/00*
U.S. Cl. 219—201 **6 Claims**



1. An elevator coil heat exchanger assembly comprising:

a plurality of refrigerant carrying tubes,

a plurality of cooling fins disposed in heat conducting relation with said tubes,

said cooling fins being disposed in spaced relation with a predetermined spacing,

a heating element for defrosting the evaporator coil section,

and a plurality of spring retainer clips disposed to hold said heating element against the cooling fins,

each of said spring retainer clips being a single piece of wire having first and second ends, and at least first, second, and third curved sections which proceed in the recited order from the first end towards the second end,

said first, second and third curved sections each having a concave side, with the concave sides of the first and second curved sections facing one another, and with the concave side of the third curved section facing the second end of the wire,

said first, second, and third curved sections being disposed in a common plane, to enable the associated portions of the spring retainer clip to fit in the predetermined spacing between ajdacent cooling fins,

said first and second curved sections being respectively disposed about a tube of said evaporator section and about said heating element,

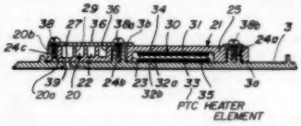
said first and second curved sections being spaced by a predetermined dimension selected to cause a spring retainer clip to exert a force against the heating element, to hold the heating element against the cooling fins.

4,716,276

ELECTRIC STEAM IRON HAVING A DETACHABLE HANDLE

Akio Motegi, and Takao Saito, both of Saitama, Japan, assignors to Sanyei Corp., Japan

Continuation of Ser. No. 637,771, Aug. 3, 1984, abandoned. This application Jul. 3, 1986, Ser. No. 882,214
Claims priority, application Japan, Sep. 5, 1983, 58-137683
Int. Cl.[4] H05B *1/02*; F22B *1/28*; D06F *75/14, 75/34*
U.S. Cl. 219—253 **13 Claims**



1. A portable steam iron, comprising:

a hollow housing; a sole plate at the base of the housing; a steam vent in the sole plate communicating with said hollow housing for outlet of steam from the housing;

a water inlet to the housing and a water supply on said housing in communication with the inlet to the hollow of the housing for delivery of water to the housing;

a generally serpentine passage defined in and through the hollow of the housing and placed and shaped for transmitting water from the vicinity of the inlet toward the steam vent and for transmitting steam to the steam vent;

heat generating means in the hollow of the housing for heating water in the passage for generating steam in the passage from water in the passage, said passage having elements therein for defining a heating surface for water, and also for heating the sole plate to an ironing temperature, the heat generating means being provided with means for establishing different levels of heating of the sole plate; the iron also comprising temperature control means having a selector knob in the housing and operatively connected to the heat generating means for selecting a heat setting for the heating means; and

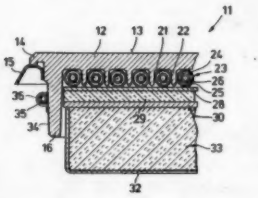
a handle detachably attachable to the housing for supporting the housing in use; the handle also having means defining a storage case for the iron emplaceable with respect to the periphery of the housing and with respect to the periphery of the sole plate; the selector knob being shaped and positioned with respect to the periphery of said housing and the sole plate to interfere with the emplacement and removal of the handle into the storage position;

the knob having a cut away portion which provides clearance for allowing the handle to be moved past the knob to the storage position; the cut away portion being located on the knob so that when the knob is rotated to the position for the heating means to be off, the cut away portion is positioned relative to the periphery of the housing and the sole plate to permit the handle to be moved past the knob through the cut away portion to the storage position.

4,716,277
ELECTRIC HOTPLATE

Felix Schreder, Oberderdingen, Fed. Rep. of Germany, assignor to E.G.O. Elektro-Geräte Blanc und Fischer, Fed. Rep. of Germany

Filed Nov. 21, 1985, Ser. No. 800,516
Claims priority, application Fed. Rep. of Germany, Nov. 29, 1984, 3443529
Int. Cl.[4] H05B 3/70
U.S. Cl. 219—449 **8 Claims**



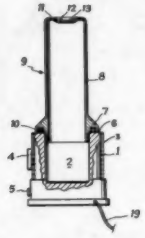
1. An electric hotplate, comprising:
- a hotplate body of cast material, the hotplate body having cast-in-slots defined on a lower side thereof, the slots being defined between narrow ribs in the hotplate body and the slots being arranged substantially parallel to one another;
- tubular heaters including electrical heating resistors embedded in an electrical heating insulating material within a tubular metal casing, the tubular heaters being arranged in the slots, the slots engaging the heaters by at least two thirds of a circumference of the tubular heaters, whereby metallic contact is provided between the metal casing and inner surfaces of the slots;
- the hotplate body having a downwardly directed rim, surrounding the hotplate body;
- a temperature regulator including a thermal expansion system having at least two temperature sensors, the two temperature sensors being filled with an expansion fluid and connected to an outside of the rim at two substantially facing portions of the rim and being interconnected with the thermal expansion system and with one another by capillary tubes; and,
- a double-contact switch responsive to the thermal expansion system and having two switch contacts operated at two temperatures by the expansion system and switching two separately-energized portions of said tubular heaters.

4,716,278
APPARATUS FOR WARMING UP AND STERILIZING BABIES BOTTLES

Alain Cappe, Quiberon, and Claude Nabet, Montrouge, both of France, assignors to Thermababy, S.A., Auray, France

Filed Jun. 10, 1986, Ser. No. 872,578
Claims priority, application France, Jun. 10, 1985, 85 08745
Int. Cl.[4] H05B 3/58
U.S. Cl. 219—521 **7 Claims**

1. An electrical apparatus for warming and sterilizing a baby's bottle, comprising:
- a base portion forming an open well provided with a first electrical heating device controlled by a thermostat and adapted to warm up the bottle,
- a lid adapted to be hermetically fixed on said base portion forming together with said well a tightly closed compartment, said compartment adapted to contain a bottle and to hold water, and having at least one valve communicating between the compartment and the exterior of said apparatus,
- a second electrical heating device for heating the water held in said closed compartment to a temperature higher than 100° C., and for sterilizing said bottle,
- means for controlling said second electrical heating device,

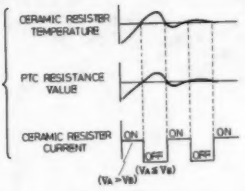


- means for disconnecting said second electrical heating device after sterilization has been accomplished.

4,716,279
SELF-TEMPERATURE CONTROLLING TYPE HEATING DEVICE

Makoto Hori, Ohgaki; Toshiatsu Nagaya, Kariya; Hirokatsu Mukai; Hitoshi Niwa, both of Okazaki, and Naoto Miwa, Tsushima, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Aug. 30, 1985, Ser. No. 771,053
Claims priority, application Japan, Sep. 7, 1984, 59-188672
Int. Cl.[4] H05B 1/02
U.S. Cl. 219—541 **6 Claims**

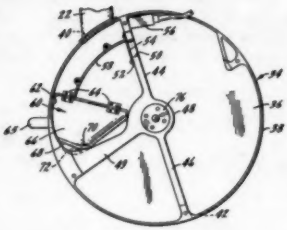


1. A self-temperature controlling type heating device comprising:
- a ceramic resistor having:
- a first domain which has a substantially low resistance and hardly or never exhibits a positive temperature coefficient, said first domain being designed to have a thickness in which a logarithm of a ratio of resistance value at 200° C. to that of 20° C. is not more than 2; and
- a second domain which has a higher resistance than said first domain and remarkably exhibits a positive temperature coefficient, said second domain having a characteristic in which a logarithm of a ratio of resistance value at 200° C. to that of 20° C. is more than 2.
- first and second electrodes provided on said first domain to flow an electric current through said first domain and allow said first domain to generate heat,
- a third electrode provided on said second domain to flow an electric current through said second domain in cooperation with said first electrode, and
- an electric control circuit for controlling the electric current flow in said first domain in accordance with electric resistance variation of said second domain which is caused by the heating effect of the heat generation of said first domain.

4,716,280
PARTICLE COUNTING DEVICE

Ray Eberle, Champaign, Ill., assignor to Illinois Foundation Seeds, Inc., Champaign, Ill.

Filed Jan. 12, 1987, Ser. No. 2,191
Int. Cl.[4] G06M *9/02*
U.S. Cl. 235—98 C **16 Claims**

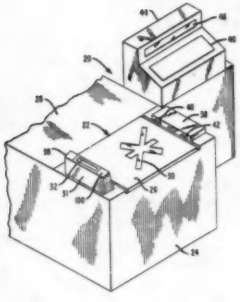


1. A counting device for counting particles of granular material, comprising:
- a housing having at least one surface defining at least a partial enclosure;
- particle supply means associated with the housing for introducing uncounted particles into the housing;
- counting means mounted on the housing surface for counting individual particles;
- a well having at least one wall pivotally mounted to the housing surface for rotation between a first normal position wherein the well receives and holds uncounted particles from the supply means and a second cleanout position wherein uncounted particles are purged from the housing;
- transferring means mounted in the housing enclosure for carrying individual particles from the well to the counting means where they are counted and then released; and
- discharge means associated with the housing for directing counted particles out of the counting device.

4,716,281
METHOD FOR CONTROLLING TERMINAL DISPLAY INDICATION

Gene L. Amacher, Cambridge; Gene R. Mathes, Zanesville; John F. Paugstat, Salesville, and Barry M. Mergenthaler, Cambridge, all of Ohio, assignors to NCR Corporation, Dayton, Ohio

Filed May 27, 1986, Ser. No. 867,658
Int. Cl.[4] G06K *15/00*
U.S. Cl. 235—383 **9 Claims**

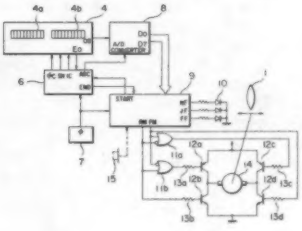


1. A method for utilizing a single display of a system having a terminal and both merchandise item scanning capability including a scanner and merchandise item weighing capability including a scale to display both information derived from scanning a merchandise item and information derived from weighing a merchandise item, and to provide similar indications of the correctness of a scanning operation and the correctness of a weighing operation to a terminal operator, said display having associated therewith a first indicator for indicating a satisfactory scan or a satisfactory weigh and a second indicator for indicating that a satisfactory scan or a satisfactory weigh has not been completed, comprising the following steps:
- maintaining both of said first and second indicators in an unactivated condition during the time that a scanning operation is in progress;
- activating the first or the second indicator to indicate a successful or an unsuccessful scanner operation; and
- initiating a weighing operation only when either said first indicator or said second indicator is activated, and when an item to be weighed is placed on the scale and a steady representation of its weight is generated.

4,716,282
FOCUS STATE DETECTION METHOD AND APPARATUS WITH SELECTIVE STATISTICAL PROCESSING

Akira Akashi, Yokohama; Hiroshi Ohmura, Wako; Akira Ishizaki, Yokohama; Keiji Ohtaka, Tokyo, and Yasuo Suda, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 9, 1985, Ser. No. 764,002
Claims priority, application Japan, Aug. 17, 1984, 59-171038
Int. Cl.[4] G01N *1/20*
U.S. Cl. 250—201 **13 Claims**



1. A focus state detection method comprising:
- a first step of photoelectrically detecting an image pattern of an object to produce a detection signal;
- a second step of sampling the detection signal a plurality of times, statistically processing the detection signals and detecting focus state in accordance with a result of the statistical processing;
- a third step of detecting focus state in accordance with the detection signal without the statistical processing; and
- a fourth step of selecting one of said second step and said third step.

4,716,283
OPTICAL HEAD FOR FOCUSING A LIGHT BEAM ON AN OPTICAL DISK

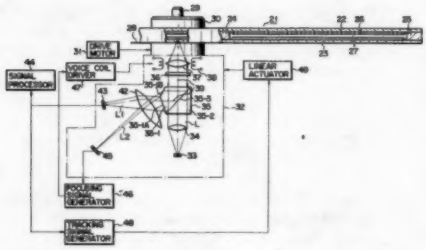
Hideo Ando, Hino, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jun. 7, 1985, Ser. No. 742,396
Claims priority, application Japan, Jun. 12, 1984, 59-120373
The portion of the term of this patent subsequent to Jun. 4, 2002, has been disclaimed.
Int. Cl.[4] G01J *1/20*
U.S. Cl. 250—201 **20 Claims**

1. An optical head for focusing a light beam on an information recording layer, comprising:
- light source means for emitting a light beam;
- objective lens means for converging the light beam emitting from the light source, applying the light beam to the

information recording layer and transferring the light beam reflected from the information recording layer, said objective lens means forming a focused beam spot corresponding to a beam waist of said light beam on the information recording layer when said light beam is accurately focused on the information recording layer, and for forming a beam spot larger than said focused beam spot on the information recording layer when said light beam is inaccurately focused on the information recording layer;

means for reducing, in a predetermined direction, the size of the light beam transferred from the objective lens means;



first photodetecting means with first and second photosensitive regions on which the transferred light beam is applied; and

means for shielding a portion of the light beam reduced in said predetermined direction in accordance with the distance between the objective lens means and information recording layer, thereby applying the light beam to the first and second photosensitive regions when it is accurately focused on the information recording layer and to only one of the first and second photosensitive regions when it is inaccurately focused on the information recording layer.

4,716,284

PHOTOGRAPHIC OPTICAL SYSTEM HAVING ENHANCED SPECTRAL TRANSMITTANCE CHARACTERISTICS

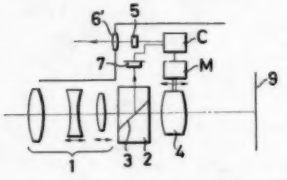
Tsunefumi Tanaka, Kanagawa, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 8, 1985, Ser. No. 709,447

Claims priority, application Japan, Mar. 12, 1984, 59-46853

Int. Cl.⁴ G03B *3/10*

U.S. Cl. 250—201 **10 Claims**



6. A photographic optical system comprising:

(a) objective optical means having an optical path;

(b) optical path splitting means arranged on the image side of said objective optical means for splitting said optical path;

(c) image receiving means arranged on one of the split parts of the optical path to receive an image of an object;

(d) a light source for emitting a light beam of invisible wavelength region and a light detector for receiving said light beam reflected from said object for detecting whether or not the image of the object is focussed on the image receiving means, at least one of said light source and light detector being located on another of the split parts of said optical path; and

(e) rear optical means arranged between said optical path splitting means and said image receiving means, wherein the superimposed characteristic of the spectral transmittance characteristic of said objective optical means and the spectral transmittance characteristic of said rear optical means matches the sensitivity characteristic of said image receiving means, and in said invisible wavelength region the spectral transmittance of said objective optical means is larger than the spectral transmittance of said rear optical means.

4,716,285

LIGHT AMOUNT CORRECTION METHOD AND APPARATUS FOR IMAGE OUTPUT SYSTEM

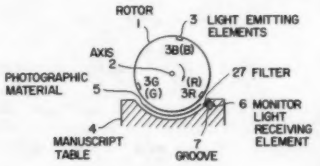
Masahiro Konishi, Kaisei, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-Ashigara, Japan

Filed Aug. 21, 1985, Ser. No. 767,911

Claims priority, application Japan, Aug. 23, 1984, 59-175763; Sep. 5, 1984, 59-185897

Int. Cl.⁴ G01J *1/32*

U.S. Cl. 250—205 **10 Claims**



1. A light amount correction apparatus for an image recording system wherein a photographic material is exposed with light from semiconductor light sources of three colors to record images, which comprises:

a driving circuit which controls said semiconductor light sources electrically with image signals so as to emit light;

a monitor circuit which sequentially measures the amount of light emitted from said semiconductor light sources with a photosensor and respectively outputs voltage signals corresponding thereto;

setting circuits for respectively setting reference signals for the three colors;

a correction circuit which adds deviations to said image signals, said deviations being obtained by respectively comparing voltage signals from said monitor circuit with said reference signals; and

a filter disposed between said semiconductor light sources and said photosensor for equalizing a spectral sensitive characteristic of said photosensor with a spectral sensitive characteristic of said photographic material;

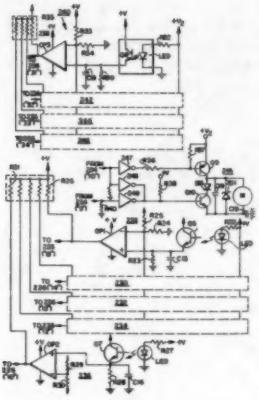
wherein each exposure amount of light from said semiconductor light sources pass through said filter so as to always expose said photographic material with light having a constant amount and temperature.

4,716,286

ELECTRO-OPTICAL PAPER DISPENSER CONTROLLER HAVING A VARIABLE GAIN AMPLIFIER WITH DIGITAL INPUT CONTROL MEANS

Lawrence D. Taylor, Lansdale, Pa., assignor to Brandt, Inc., Bensalem, Pa.

Division of Ser. No. 699,055, Feb. 7, 1985, Pat. No. 4,660,822.
This application Mar. 27, 1986, Ser. No. 844,891
Int. Cl.[4] H01J 40/14
U.S. Cl. 250—214 R 6 Claims



1. A gain control circuit for automatically adjusting the output of a liquid sensing element comprising:

a light source;

said light sensing element being positioned to receive light from said light source;

a variable gain amplifier including digital input control means for amplifying the output signal of said sensing element wherein the gain is adjusted in accordance with a digital input applied to said input control means;

converter means for converting the amplified signal to a digital output;

means for comparing the digital output against a selectable reference value;

said comparison means including means for applying a digital signal to the input control means of said variable gain amplifier to adjust the gain of the variable gain amplifier to bring the digital output of said converter means into comparison with said reference value.

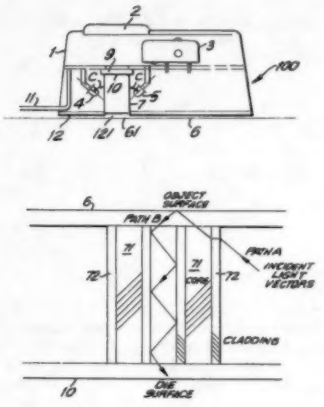
4,716,287

LIGHT PIPE FOR AN OPTICAL MOUSE

Eric Nestler, Cambridge, Mass., assignor to Symbolics Inc., Cambridge, Mass.

Filed Sep. 6, 1985, Ser. No. 773,403
Int. Cl.[4] G09G 1/00; H01J 5/16
U.S. Cl. 250—227 7 Claims

1. In a device for optically sensing an image on a planar object surface, wherein the device has a planar base with an aperture therein framing a particular portion of the image on the object surface to be sensed and shielding said portion from ambient light, optical sensing means having a surface disposed substantially in a single plane and light transmission means for transmitting light from the object surface at the aperture to the sensing surface, the improvement wherein: the sensing surface is disposed parallel to the planar base and vertically aligned with the aperture; the light transmission means comprises a block of light transmitting fibers disposed between the sensing surface and the aperture, at least one light source disposed above the base and directing light of a given wavelength solely on the sides of the block at an acute angle; wherein the block comprises a plurality of parallel light transmissive regular polygonal fiber cores each surrounded by light transmissive cladding having a lower index of refraction than the core, wherein the thickness of the cladding is greater than the given



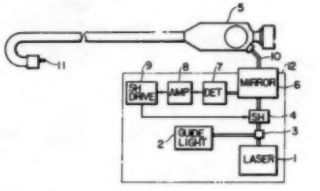
wavelength of the light from the light source and the ratio of the width of the core to the thickness of the cladding ranges from 4 to 24.

4,716,288

SECURITY DEVICE FOR DETECTING DEFECTS IN TRANSMITTING FIBER

Yuzuru Doi, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 316,385, Oct. 29, 1981, abandoned.
This application Apr. 2, 1986, Ser. No. 847,137
Claims priority, application Japan, Nov. 1, 1980, 55-154328
Int. Cl.[4] G01N 21/88
U.S. Cl. 250—227 16 Claims



1. In a laser machining or medical instrument wherein a laser irradiating light beam and a guide light beam are introduced into an optical fiber through an entrance end face thereof, are transmitted along said optical fiber and exit said optical fiber from an exit end face thereof, fault detecting means comprising:

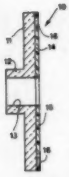
light detecting means for detecting the amount of light reflected back toward said entrance end face by interior surfaces of said optical fiber, laser cutoff means, and drive means for actuating said laser cutoff means when the amount of light detected by said light detecting means varies from a predetermined value determined accordance with the amount of reflection normally caused at said fiber exit end face.

4,716,289

OBTURATOR DISC FOR AN OPTICAL TRANSDUCER

Giampaolo Guerrini, Ivrea, and Emilio Caligaris Cappio, Biella, both of Italy, assignors to Ing. C. Olivetti & C., S.p.A., Ivrea, Italy

Filed Apr. 30, 1985, Ser. No. 728,865
Claims priority, application Italy, May 2, 1984, 67437 A/84
Int. Cl.[4] G01D 5/34
U.S. Cl. 250—231 SE 8 Claims



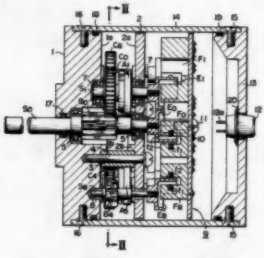
1. An obturator disc for an optical transducer comprising:
a cylindrical element of transparent plastic material having a front surface, and a central hub projecting from a rear surface opposite to said front surface and provided with a through hole for fitting the cylindrical element to a rotating member, wherein the central hub and the cylindrical element with its front surface are obtained as a single moulding; and
a layer of opaque material fixed on the front surface of said cylindrical element to define said obturator disc;
wherein said layer of opaque material comprises a deposit of photosensitive material provided with a plurality of transparent radial windows disposed along an annular zone of said front surface coaxial with an axis of the through hole of said central hub; and
wherein said radial windows are obtained by exposition of said photosensitive material to light and through a pattern mask coaxial with the axis of the through hole of said central hub and in which have been preformed said radial windows.

4,716,290

ROTARY ENCODER WITH INTERMITTENT FEED MEANS

Yoshiaki Ogawa, Kamakura, Japan, assignor to Nippon Gear Co., Ltd., Fujisawa, Japan

Filed Nov. 6, 1984, Ser. No. 668,751
Claims priority, application Japan, Nov. 29, 1983, 58-223128
Int. Cl.[4] G01D 5/38
U.S. Cl. 250—231 SE 9 Claims



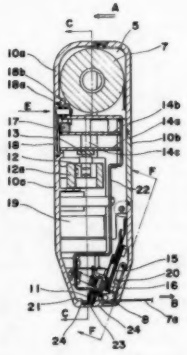
1. A compact rotary encoder including encoders, gear shafts and a train of gears, each having teeth meshed together in a multi-stage arrangement, each stage comprising a driving wheel, a driven wheel, and a second driven wheel so as to successively reduce rotation of later stages, the encoders are provided with the gear shafts at desired stages in order to count revolutions of a power input shaft, said driving and driven wheels being spur gears, wherein the driving spur gear and its corresponding driven spur gear, between each desired stages of the train of gears, form an intermittent feed means permitting idling of said driving spur gear and reducing rotation between desired stages, characterized in that:
the number of teeth of said driving spur gear is 16 and the number of teeth of said driven spur gear is 8, the teeth of said driving spur gear are removed except for two teeth adjacent each other and another two mutually-adjacent teeth which are diametrically opposite the two adjacent teeth, wherein said intermittent feed means has a gear ratio of 4:8 so as to achieve a revolution reduction ratio of $\frac{1}{2}$ and said encoders are one-bit encoders mounted on end portions of each of said gear shafts of the respective stages of the train of gears.

4,716,291

COPYING MACHINE

Hiroshi Sakamoto, Fukuoka; Toshihiro Torigoe, Kasuya, and Tadashi Yamaguchi, Fukuoka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed May 14, 1985, Ser. No. 733,806
Claims priority, application Japan, May 16, 1984, 59-97984; May 16, 1984, 59-97983; Jan. 18, 1985, 60-6960
Int. Cl.[4] G03C 5/16
U.S. Cl. 250—318 20 Claims



1. A copying machine comprising:
an image sensor of train type having a plurality of sensing cells arranged in a line for detecting image information of a manuscript to be copied;
an illumination means for illuminating the manuscript to be copied with a beam of light;
an optical means for introducing the beam of light so as to be focused with the image of the manuscript to be copied on the image sensor;
a print means for printing image information onto a copy paper in accordance with an output of the image sensor;
an electric power source for supplying electric power to the image sensor and the print means;
a housing for accommodating therein the image sensor, the illumination means, the optical means, the print means, the electrical power source, and copy paper; and
paper guiding means in the housing for guiding the copy paper in contact with the print means and then out of the housing in overlapping relationship with the manuscript to be copied during a copying operation, the paper guiding means comprising an opening adjacent a portion of the housing which confronts the manuscript during the copying operation so that the copy paper can be withdrawn from the housing by fixing a portion of the copy paper in contact with the manuscript with one hand of a user of the

copying machine and moving the housing relative to the manuscript with the other hand of the user to thereby apply image information to the copy paper with the print means as the copy paper is withdrawn from the housing.

4,716,292

LINEAR INCREMENTAL MEASURING SYSTEM FOR MEASURING SPEED AND DISPLACEMENT

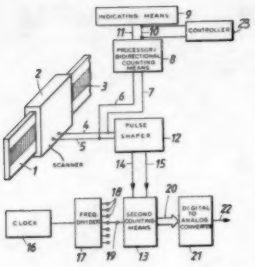
Heinz Rieder, St. Pantaleon, and Max Schwaiger, Ostermiething, both of Austria, assignors to RSF-Electronik Gesellschaft m.b.H., Tarsdorf, Austria

Filed Jul. 1, 1985, Ser. No. 750,859

Claims priority, application Austria, Jul. 6, 1984, 2174/84

Int. Cl.[4] G01D *5/34*

U.S. Cl. 250—237 G **3 Claims**



1. A linear measuring system, comprising:

a linear incremental scale;

a scanning unit displaceable in a scanning movement along said scale for generating two phase-displaced analog signals in response to said scanning movement, a direction of phase displacement of said analog signals representing direction of said scanning movement;

a processor connected to said scanning unit and receiving said analog signals thereform for generating digital signals representing said analog signals and for simultaneously generating direction-indicating signals;

bidirectional counting means connected to said processor and receiving said digital signals therefrom for counting said digital signals and generating a count related to the extent of said scanning movement and receiving direction-indicating signals from said processor so that the direction of counting by said counter represents the direction of said scanning movement;

indicating means connected to said counting means for providing a display of said extent of said scanning movement;

a digital-to-analog conversion circuit connected to said processor and receiving said digital signals therefrom for converting said digital signals to an analog output proportional to the velocity of said scanning movement and with a polarity which depends upon the direction of said scanning movement,

said digital-to-analog conversion circuit comprising:

second counting means for receiving digital signals from said processor and for counting said digital signals,

a digital-to-analog converter for sampling the count of said second counting means and for deriving from the count thus sampled an analog voltage having under the control of said direction-indicating signals a polarity depending on the instantaneous direction of said scanning movement, and

means comprising a clock effecting a sampling of the count of said second counting means by said digital-to-analog coverter and a resetting of said second counting means during alternate periods defined by said clock wherein said second counting means being bidirectional counting means for counting said digital signals from said processor in a sense depending on the concurrently generated direction-indicating signals.

4,716,293

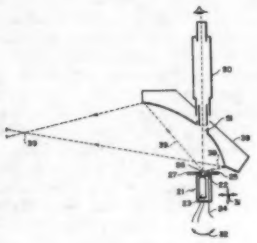
ACCESSORY FOR INFRARED EMISSION SPECTROSCOPY

Nicolas J. Harrick, Croton Dam Rd., Ossining, N.Y. 10562

Filed May 16, 1986, Ser. No. 863,732

Int. Cl.[4] G01N *21/62*; G01J *3/443*

U.S. Cl. 250—340 **15 Claims**



1. An accessory for infrared emission spectroscopy comprising:

a. a base member;

b. a member having a sample-supporting surface portion mounted on the base member;

c. a masking member mounted closely adjacent and over the sample-supporting surface portion and having a highly-reflecting upper surface and a small aperture therein;

d. a curved first mirror subtending a large solid angle and having a first focus and mounted on the base member;

e. said masking member being mounted so as to extend completely between the curved first mirror and the sample-supporting surface portion and such that the first focus of the first mirror is located substantially at the said aperture.

4,716,294

PYRODETECTOR FOR THE DETECTION OF A BODY ENTERING INTO ITS DETECTION AREA

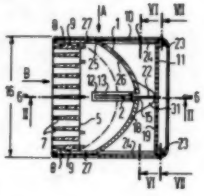
Felix Fettke, Herzebrock; Hans Siwon, Obing, and Hans Meixner, Haar, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Aug. 18, 1986, Ser. No. 897,300

Claims priority, application Fed. Rep. of Germany, Sep. 11, 1985, 3532476

Int. Cl.[4] G08B *13/18*; G01J *5/12*

U.S. Cl. 250—353 **13 Claims**



1. A pyrodetector for detection of a body entering into a detection area of the pyrodetector, said body having a temperature deviating from its environment, comprising:

a concave mirror shaped to focus heat radiation emanating from the body;

a first sensor element positioned at a focus of the concave

mirror and at least one further sensor element positioned for compensation of environmental influences;

a film of uniform electrically non-conductive material having an iso-directional, permanent orientation polarization and electrodes situated thereon which are employed to form the first and further sensor elements;

the film and sensors forming an arrangement which is secured in a mounting;

a covering positioned to cover a cavity of the mirror and which is permeable to incident radiation;

an electronic evaluation means;

the film and sensor elements being arranged in the concave mirror such that radiation reflected by the concave mirror is incident on both surface sides of the film;

the concave mirror being a parabolic mirror dimensioned such that its focus lies in an inner half thereof;

the film with the sensor elements lying at an optical axis of the concave mirror so that the first sensor element is essentially impinged only by a radiation of the body which has been reflected in the concave mirror when the body is situated at a large distance relative to a size of the mirror;

the covering comprising a thin film of polyethylene which is stretched over a honeycomb lattice acting as a support and which is arranged in front of the cavity of the mirror;

said concave mirror being formed of a body having side walls perpendicular to one another and having a rectangular cross-section with a major axis and a minor axis, and a reflector portion extending inwardly from said side walls and curved in two planes forming a continuous arced surface as said concave mirror;

said film with said sensor elements being positioned in said mounting parallel to said minor axis, and an opening in said reflector portion of said concave mirror which is dimensioned to permit insertion of said film together with a retaining frame carrying said film and said mounting;

said mounting comprising two spaced apart U-shaped parts dimensioned for mounting said retaining frame, said U-shaped parts being parallel to one another from said opening into the cavity of the concave mirror;

said electronic evaluation means comprising a circuit board with printed interconnnects and active and passive electrical components, said circuit board being arranged outside of said concave mirror and behind the reflector portion thereof, and said sensor elements being connected to said evaluation means via plug pins extending from said retaining frame;

said electronic evaluation means being held by resilient clamps provided with barbs, said clamps being secured to said body rearwardly of said concave mirror; and

said concave mirror, retaining frame with the film and sensor elements, the electronic evaluation means, and the honeycomb lattice provided with the cover being accommodated in a housing means for shielding against disturbing influences.

4,716,295

ION BEAM GENERATOR

Yoshihiro Ueda; Kouichi Ono; Tatsuo Oomori, and Shigeto Fujita, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 1, 1985, Ser. No. 782,725

Int. Cl.[4] H01J *37/00*

U.S. Cl. 250—423 P **36 Claims**

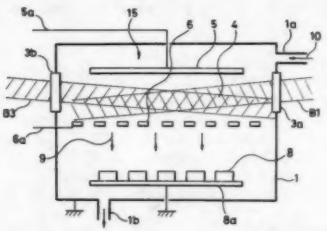
1. An ion beam generator, which comprises:

an ion generating section for generating ions where a material to be ionized is introduced;

a light source for introducing a light into said ion generating section which light has a wavelength such that it excites the material to be ionized to a Rydberg state from a ground state of said material by a resonance excitation;

a pair of electrodes for generating an electric field for ionizing said material by Stark effect which has been excited to the Rydberg state; and

a material support for supporting a material to which ionized ions are irradiated, which support also functions as an electrode for generating an ion drawing out electric field



in cooperation with one of said pair of electrodes such that ions pass through said one of said pair of electrodes to irradiate said material.

4,716,296

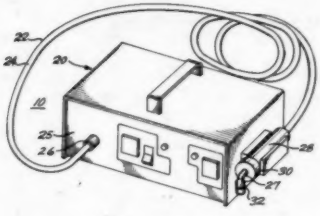
APPARATUS FOR CURING DENTAL RESTORATIVE COMPOSITES

Ronald L. Bussière, Edmonds, and Robert J. Smith, Lynnwood, both of Wash., assignors to Surgicorp, Lynnwood, Wash.

Filed Apr. 26, 1982, Ser. No. 371,610

Int. Cl.[4] H01J *61/40*

U.S. Cl. 250—504 H **6 Claims**



1. An apparatus for applying light in selective frequency ranges to organic composite materials used in restorative dentistry for optimum curing of the composite materials, comprising:

light bulb means;

means for energizing said light bulb means;

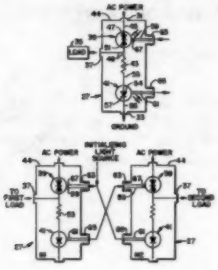
and filter means selected with reference to the composition of the composite material to be cured and used to attenuate substantially all frequencies of light produced by said light bulb means except the frequency range which produces uniform curing of the composite material without causing radical cross-linking of the composite material; and

further comprising a flexible, light transmitting cord means having a first end in light transmission communication with said light means and means for detachably mounting said filter means on the end portion of said light cord means distal from said light means.

4,716,297
METHOD AND APPARATUS FOR OPTICALLY SWITCHING CURRENT

Harry D. Wills, Mentor, Ohio, and Joseph L. Betthauser, San Jose, Calif., assignors to General Electric Company, San Jose, Calif.

Filed Jun. 10, 1985, Ser. No. 743,001
Int. Cl.[4] G02B 27/00
U.S. Cl. 250—551 17 Claims



1. A relay, comprising:

a photoelectric element having first and second electrodes and photosensitive means responsive to optical stimulation for electrically coupling said first and second electrodes so as to permit transmission of electrical current therebetween;

a first electrical terminal electrically coupled to said first electrode of said photoelectric element for connecting said relay to a source of electrical power;

an optically opaque housing encasing at least said photosensitive means of said photoelectric element;

an optical input port optically coupled to said photosensitive means defined through said optically opaque housing;

a light source having first and second electrodes, responsive to electrical current therebetween for emitting light;

an optical output port optically coupled to said light source;

said second electrode of said photoelectric element electrically coupled to a second electrical terminal and to said first electrode of said light source; and

a third electrical terminal electrically coupled to said second electrode of said light source for permitting some of the current through said photoelectric element to energize said light source.

2. Electrical switching apparatus comprising:

first and second relays each having a first electrical terminal for connection to a source of electrical power and a second electrical terminal for connection to an electrical load;

said first relay comprising first means for electrically coupling its first and second terminals in response to a first signal, and means to emitting light in response to the electrical coupling of its first and second electrical terminals;

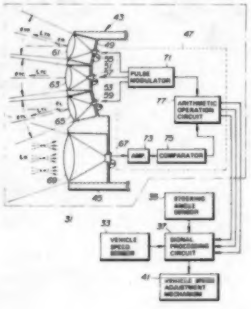
said second relay comprising second means for electrically coupling its first and second electrical terminals in response to an optical signal from said light emitting means of said first relay, comprises means for emitting light in response to the electrical coupling of its first and second electrical terminals, and further comprising means for optically coupling said light emitting means of said second relay to said first electrical coupling means; and

means for optically coupling said light emitting means of said first relay to said second electrical coupling means.

4,716,298
SYSTEM FOR AUTOMATICALLY DETECTING PRESENCE OR ABSENCE OF A PRECEDING VEHICLE AND METHOD THEREFOR

Yoshiyuki Etoh, Yokosuka, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan

Filed May 30, 1985, Ser. No. 739,152
Claims priority, application Japan, Jun. 1, 1984, 59-110692
Int. Cl.[4] G01N 21/86
U.S. Cl. 250—561 8 Claims



1. A system for detecting the presence or absence of a vehicle present in a detection area of a subject vehicle on which the system is mounted, comprising:

(a) first means for transmitting measuring media over the detection area toward which the measuring media are simultaneously transmitted in mutually different directions and through respectively predetermined angles with respect to a longitudinal axis of the subject vehicle;

(b) second means for outputting a first signal upon receipt of any one of the measuring media from the first means reflected by an object which is present in the detection area the subject vehicle, said first signal indicating the direction of propagation of the reflected measuring media toward the object, for calculating a distance between the subject vehicle and the object on the basis of the propagation delay between transmission of the measuring media from the first means and reception of the reflected wave from the object and outputting a second signal indicating the calculated distance between the subject vehicle and the object; and

(c) third means for recognizing whether the object is a vehicle present in the detection area on the basis of the first and second signals outputted from said second means.

4,716,299
APPARATUS FOR CONVEYING AND INSPECTING A SUBSTRATE

Hiroshi Tanaka; Hiromitsu Iwata, and Yukio Kakizaki, all of Yokohama, Japan, assignors to Nippon Kogaku K. K., Tokyo, Japan

Filed Jan. 23, 1986, Ser. No. 821,743
Claims priority, application Japan, Jan. 31, 1985, 60-17318
Int. Cl.[4] G01N 21/86
U.S. Cl. 250—571 11 Claims

1. An arrangement in an apparatus for handling a substrate such as a photomask or a reticle used in a process of manufacturing a semiconductor device, comprising:

a container unit for containing therein said substrate in a substantially horizontal posture;

an inspection unit having means for inspecting a surface of said substrate, said inspecting means including radiation means for supplying a directional beam to said surface, and means for detecting scattering of said directional beam from the surface of said substrate;

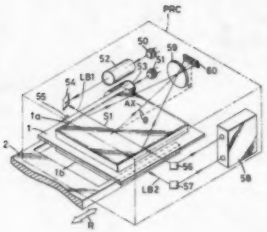
a holding member for holding said substrate substantially horizontally;

a support member having a guide member for supporting said holding member movably in a horizontal direction;

first drive means for moving said support member between a first position wherein said guide member is opposed to said container unit and a second position wherein said guide member is opposed to said inspection unit;

second drive means for moving said holding member relative to said guide member;

third drive means operable to fix said substrate to said holding member and to separate said substrate from said holding member; and



operation means for controlling said first, second and third drive means so that, when said support member is moved in said first position, said substrate is fixed to said holding member and said holding member is moved by said second drive means to remove said substrate from said container unit, and when said support member is in said second position, said holding member is moved by said second drive means together with said substrate to cause a relative displacement between said substrate and said directional beam for inspecting said substrate by said inspecting means.

4,716,300

APPARATUS FOR SCANNING DOCUMENTS IN A RASTER LINE MODE USING MARGIN STOPS

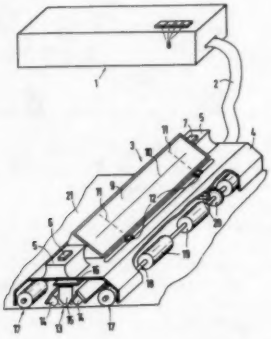
Wolfgang Andrich, and Helmut W. Schilling, both of Pforzheim, Fed. Rep. of Germany, assignors to Alcatel NV, Amsterdam

Filed Jul. 3, 1986, Ser. No. 881,763

Claims priority, application Fed. Rep. of Germany, Jul. 17, 1985, 3525450

Int. Cl.[4] H04N *1/10*

U.S. Cl. 250—578 **2 Claims**



1. Optical scanner apparatus for raster line scanning of a document which has text on its upper side and which is supported on a flat surface, said apparatus comprising:

a hand device comprising:

a optical scanner comprising a linear array of optical to electric transducing elements,

a position encoder for generating signals synchronized to the scanning of said document,

a display panel for displaying data indicative of that line area of said document above which said optical scanner is located,

two margin stops whose positions are indicated by respective displayed vertical lines on said display panel; and

a control logic device for operating said hand device and for selectively storing only that portion of the scanned data presented on said display panel between said two vertical lines.

4,716,301

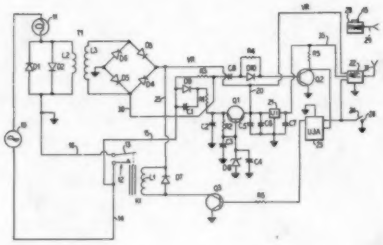
DIGITAL LIGHT CONTROL

Colin B. Willmott, Buffalo Grove; Carl T. Heitschel, Oak Brook, and Bernard J. Wojciak, Jr., Woodridge, all of Ill., assignors to Chamberlain Manufacturing Corporation, Elmhurst, Ill.

Filed Apr. 8, 1986, Ser. No. 849,276

Int. Cl.[4] G08B *1/00*

U.S. Cl. 307—115 **11 Claims**



1. A power circuit for remotely or locally energizing a load, comprising, an A.C. power source, a first power supply comprising a first switching means which can be either in the opened or closed position, said A.C. power source connected to one side of said first switching means, said load with one side connected to the second side of said A.C. power source, a pair of back to back diodes connected to said A.C. power source and a transformer with its primary winding in parallel with said back to back diodes and with one side connected to the second side of said load, the second side of said first switching means and the second side of said transformer connected to ground, a transmitter, a receiver energized by said transmitter and connected to a trigger circuit, said trigger circuit connected to said first switching means to move it from an opened to a closed position, a diode rectifier connected to said receiver, a secondary winding of said transformer connected to said diode rectifier, a clock circuit connected between said trigger circuit and said first side of said A.C. power source and an amplifier circuit connected between said first side of said A.C. power source and said receiver.

4,716,302

IDENTITY CIRCUIT FOR AN INTEGRATED CIRCUIT USING A FUSE AND TRANSISTOR ENABLED BY A POWER-ON RESET SIGNAL

Stephen T. Flannagan, Austin; Lawrence J. Day, Manchaca, both of Tex., and Barry A. Simon, San Jose, Calif., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 22, 1986, Ser. No. 945,253

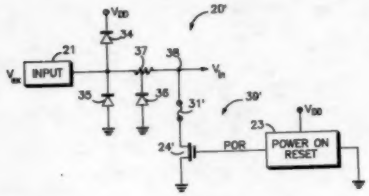
Int. Cl.[4] H03K *17/18*

U.S. Cl. 307—200 B **20 Claims**

1. In an integrated circuit having an input with ESD protection having a first diode coupled between the input and a first

power supply terminal, and a second diode coupled between the input and a second power terminal, an identifying circuit comprising:

power on reset means for providing a power on reset pulse



in response to application of a voltage between the first and second power supply terminals; and

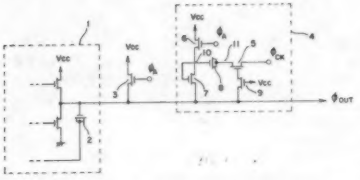
control means, coupled to the power on reset means, for coupling the input to the first power supply terminal in response to receiving the power on reset pulse.

4,716,303

MOS IC PULL-UP CIRCUIT

Toshio Mimoto, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed May 1, 1985, Ser. No. 729,190
Int. Cl.[4] H03K *19/096*
U.S. Cl. 307—264 **1 Claim**



1. A MOS IC pull-up circuit for statically holding a signal outputted during an active stage of a dynamic memory element, which signal has been boosted to a level at least equal to a power source voltage, comprising:

a first MOSFET having a drain terminal connected to said power source and a gate terminal connected to a node of an active signal representative of said active stage;

a second MOSFET having a drain terminal and a gate terminal both connected to a source terminal of said first MOSFET, and a source terminal connected to said boosted signal;

a third MOSFET;

a fourth MOSFET;

a MOS capacitance;

said MOS capacitance being connected between a source terminal of said third MOSFET and said source terminal of said first MOSFET, a gate terminal of said third MOSFET being connected to said boosted signal through a source-drain channel of said fourth MOSFET, a gate terminal of said fourth MOSFET being connected to said power source, and a periodic signal being connected to a drain terminal of said third MOSFET,

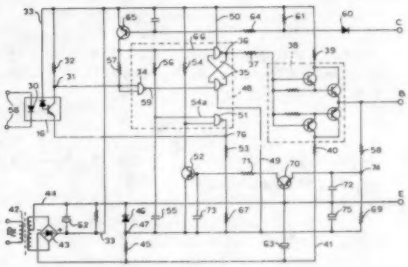
said boosted signal being held at a level at least equal to said power source voltage during said active stage, through a boosting operation of said first through fourth MOSFETS and said MOS capacitance.

4,716,304

DRIVER CIRCUIT FOR HIGH-VOLTAGE POWER TRANSISTORS PROVIDING PROTECTION TO THE DRIVER TRANSISTORS

Arnim Fiebig, Leinfelden, and Rupert Weber, Schneeberg, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Jun. 20, 1986, Ser. No. 876,699
Claims priority, application Fed. Rep. of Germany, Jun. 22, 1985, 3522429
Int. Cl.[4] H03K *17/60, 3/26, 19/24*
U.S. Cl. 307—270 **13 Claims**



1. Driver circuit means for an even plurality of high voltage power switching transistors each having a switchable path between collector and emitter thereof and a base electrode for switching control of said path and each having a free wheeling diode connected antiparallel to said switchable path of said power switching transistor, said even plurality of power switching transistors having their respective switchable paths connected in cascade between positive and negative poles of a d.c. voltage source, and a load for said power switching transistors being connected between a midpoint of said cascade connection of power switching transistors and a conductor maintained at a potential midway between the respective potentials of said positive and negative poles of said source of d.c. voltage, comprising:

an individual driver circuit and an individual driver power supply unit for each said power transistor, each said driver circuit comprising a final driver stage (**18**, **38**) a control logic stage (**17**, **48**) and a first galvanic isolation input device (**16**), which is interposed between a source (**4**, **5**) of switching control signals and an input of said control logic stage;

each driver power supply unit having a rectifier and a second galvanic isolation input device (**15**) interposed between said rectifier and a source of alternating current, said rectifier providing a reference potential output connection and at least one output connection providing a d.c. supply voltage with respect to said reference potential output connection,

said reference potential output connection being connected galvanically to the emitter of the power switching transistor for which the power supply unit containing the rectifier providing said reference potential output is individual;

each said final driver stage being powered by a said power supply unit individual to the same power switching transistor and having an output galvanically connected to the base electrode of said same power switching transistor for which the driver circuit containing the final driver stage is individual;

each said driver circuit further comprising:

a first settable and resettable bistable circuit (**35**) in said control logic stage of each said driver circuit, connected so as to store said switching control signals and to determine and time switched-on and switched-off conditions of the power transistor for which the driver

circuit is individual in accordance respectively with set and reset conditions of said first bistable circuit;

a second settable and resettable bistable circuit (**51, 52**) for registering error conditions and circuits associated therewith for setting said second bistable circuit in response to at least one of two voltage differences which are, namely, a first voltage difference between the emitter and collector of said power transistor exceeding a first predetermined value and a second voltage difference between base and emitter of said power switching transistor exceeding a second predetermined value while said first bistable circuit is set, and

a blocking circuit including a diode connected to the collector of the said power switching transistor for which the driver circuit is individual for preventing the setting of said first bistable circuit so long as said free wheeling diode connected antiparallel to the said power switching transistor conducts current.

4,716,305

SWITCHING DEVICE HAVING A FEEDBACK MEANS FOR RENDERING A CONTROL CIRCUIT INOPERATIVE IN RESPONSE TO A CURRENT SUPPLY CIRCUIT BEING INOPERATIVE

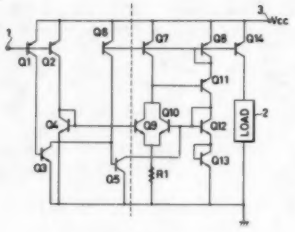
Takamasa Sakuragi, Hiratsuka, and Ikuo Fushimi, Ebina, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 27, 1986, Ser. No. 833,616

Claims priority, application Japan, Mar. 1, 1985, 60-38899

Int. Cl.[4] **H03K** *3/01, 17/60;* **H03F** *3/04;* **G05F** *3/16*

U.S. Cl. 307—296 R **1 Claim**



1. A switching device comprising:

a current supply circuit for supplying a current to a load having operating and non-operating states;

a control circuit for controlling said operating and non-operating states of said current supply circuit; and

feedback means connected between said current supply circuit and said control circuit for rendering said control circuit inoperative in response to said current supply circuit being inoperative.

4,716,306

CIRCUIT FOR DETECTING VARIATION OF RESISTANCE OF A VARIABLE-RESISTANCE ELEMENT

Naoki Sato, Hachioji; Yoshihisa Kamo, Kokubunji; Yasuhiro Katoh, Tokyo; Minoru Kosuge, and Shinichi Arai, both of Odawara, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Aug. 9, 1984, Ser. No. 639,093

Claims priority, application Japan, Aug. 15, 1983, 58-148082; Dec. 14, 1983, 58-234249

Int. Cl.[4] **H03K** *3/01, 17/90, 5/22*

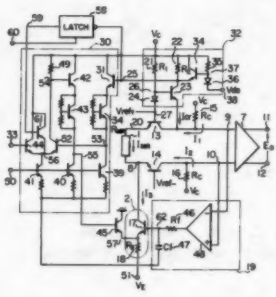
U.S. Cl. 307—296 R **18 Claims**

1. A circuit for detecting variation of resistance of a variable-resistance element which is supplied with a bias current and varies the resistance thereof in response to an external factor, said circuit comprising:

first means for applying a constant d.c. voltage across said variable-resistance element;

a current source connected to one of two terminals of said variable-resistance element to supply said bias current;

second means for detecting the variation of said bias current which flows in said variable-resistance element depending on said external factor; and



a feedback circuit for controlling said first means in accordance with the input signal or output signal of said second means,

wherein said first means comprises a pair of grounded-base transistors with their base electrodes being provided with different base voltages, with their emitter electrodes being respectively connected to said two terminals of said variable-resistance element, and with their collector electrodes being connected to the inputs of said second means.

4,716,307

REGULATED POWER SUPPLY FOR SEMICONDUCTOR CHIPS WITH COMPENSATION FOR CHANGES IN ELECTRICAL CHARACTERISTICS OR CHIPS AND IN EXTERNAL POWER SUPPLY

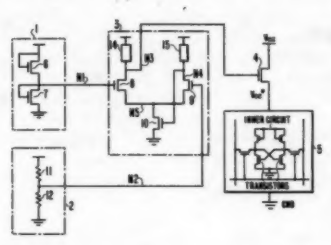
Keizo Aoyama, Yamato, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Aug. 12, 1986, Ser. No. 895,730

Claims priority, application Japan, Aug. 16, 1985, 60-179444

Int. Cl.[4] **G05F** *1/56, 5/08*

U.S. Cl. 307—297 **14 Claims**



1. A semiconductor device having an external power supply line operatively connected to receive an external power supply voltage, comprising:

a semiconductor substrate;

an inner circuit, formed on said semiconductor substrate, containing a plurality of transistors;

voltage regulating means, formed on said substrate, operatively connected to receive the external power supply voltage and operatively connected to said inner circuit, for regulating the external power supply voltage and converting the external power supply voltage to an inter-

nal power supply voltage to be applied to said inner circuit; and

controlling means, formed on said semiconductor substrate and operatively connected to said voltage regulating means, for controlling said voltage regulating means in accordance with the characteristics of said transistors in said inner circuit so that variations in the electrical characteristics of said transistors are compensated in dependence upon the external power supply voltage, said controlling means comprising:

means for providing a representative signal which represents electrical characteristics of said transistors in said inner circuit;

means for generating a reference voltage in accordance with the external power supply voltage; and

means, operatively connected to said means for providing a representative signal and said means for generating a reference voltage, for generating a regulating signal in accordance with said representative signal and said reference voltage.

4,716,308

MOS PULL-UP OR PULL-DOWN LOGIC CIRCUIT HAVING EQUALIZED DISCHARGE TIME DELAYS AND LAYOUT AVOIDING CROSSOVERS

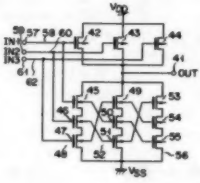
Kenji Matsuo, Yokohama; Itsuo Sasaki, Kawasaki; Hiroaki Suzuki, Yokohama, and Mitsuyuki Kunieda, Kawasaki, all of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

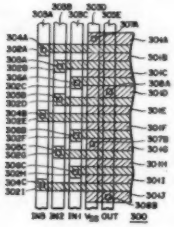
Filed Jul. 29, 1983, Ser. No. 518,751

Claims priority, application Japan, Jul. 30, 1982, 57-133541; Jul. 30, 1982, 57-133576

Int. Cl.[4] H03K *19/017;* **H01L** *27/04, 29/78*

U.S. Cl. 307—303 **3 Claims**





1. A MOS logic circuit comprising:

a semiconductor substrate of a first conductivity type;

first to tenth semiconductor regions of a second conductivity type, arranged on said substrate aligned parallel to one another with a specific interval therebetween;

first to ninth gate layers, respectively formed between said first and second semiconductor regions, said second and third semiconductor regions, said third and fourth semiconductor regions, said fourth and fifth semiconductor regions, said fifth and sixth semiconductor regions, said sixth and seventh semiconductor regions, said seventh and eighth semiconductor regions, said eighth and ninth semiconductor regions, and said ninth and tenth semiconductor regions;

a first conductive layer, connected to said first and seventh semiconductor regions, for supplying a power source voltage to said first and seventh semiconductor regions;

a second conductive layers, connected to said fourth and tenth semiconductor regions, for outputting logic output signals from said fourth and tenth semiconductor regions;

a third conductive layer, connected to said third, sixth and eighth gate layers, for supplying a first logic input signal to said third, sixth and eighth gate layers;

a fourth conductive layer, connected to said second, fourth, and seventh gate layers, for supplying a second logic input signal to said second, fourth and seventh gate layers; and

a fifth conductive layer, connected to said first, fifth and ninth gate layers, for supplying a third logic input signal to said first, fifth and ninth gate layers.

4,716,309

STATIC RELAY FOR LOW DC VOLTAGES

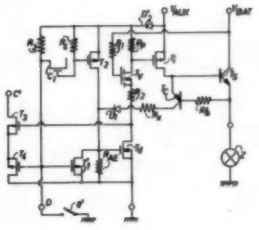
Robert J. Stroppiana, Paris, France, assignor to U.S. Philips Corporation, New York, N.Y.

Filed May 8, 1985, Ser. No. 731,814

Claims priority, application France, May 11, 1984, 8407308

Int. Cl.[4] H03K *17/08, 17/04*

U.S. Cl. 307—442 **22 Claims**



10. A static relay for supplying low DC voltages to a load comprising:

a bipolar output transistor of a first conductivity type having an emitter connected to an output terminal to which the load is to be connected, the load to be further connected to a common supply terminal, means for connecting a collector of the output transistor to a main supply terminal, a base of the output transistor being supplied by means of a main current path of a current injection transistor having a control electrode, a bipolar detection transistor of a second (opposite) conductivity type having an emitter-base path including a base resistor, said emitter-base path being connected parallel to the base-emitter path of the bipolar output transistor, a control transistor having a source connected to the common supply terminal, a drain coupled to the control electrode of the current injection transistor and a gate controlled via a control terminal which receives a control signal that causes said current injection transistor and the bipolar output transistor to become conductive, and means connecting the gate of the control transistor to the common supply terminal via a self-maintenance resistor and to a collector of the detection transistor via a diode connected in the normally forward direction for a current originating from the collector of the detection transistor whereby a self-maintenance

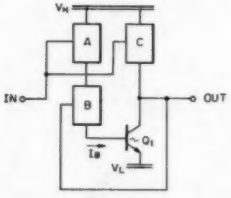
voltage is applied to the gate of the control transistor in the normal state of the load, and wherein the collector of the detection transistor produces a signal representative of the state of the load.

4,716,310

LOGICAL BIMOS GATE CIRCUIT HAVING LOW POWER DISSIPATION

Tetsu Tanizawa, Kawasaki, and Osam Ohba, Tokyo, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Sep. 30, 1985, Ser. No. 781,742
Claims priority, application Japan, Oct. 2, 1984, 59-205511
Int. Cl.[4] H03K *17/16, 19/02, 5/08, 17/60*
U.S. Cl. 307—446 **10 Claims**



1. A logical gate circuit comprising:

first and second power sources for supplying first and second levels, respectively;

an input terminal for receiving an input signal having one of the first and second levels;

an output terminal for providing an output signal having one of the first and second levels;

a switching transistor, having an emitter operatively connected to said second power source, having a collector operatively connected to said output terminal and having a base, said output terminal outputting the output signal with the second level in response to said switching transistor having an ON state;

an active load circuit, operatively connected between said first power source and the collector of said switching transistor and to said input terminal, said active load circuit being turned OFF in response to the input signal having the first level and being turned ON in response to the input signal having the second level, the output signal having the first level when said active load circuit is ON;

control transistor means, operatively connected to the base of said switching transistor having a control terminal connected (and) to said output terminal, for controlling said switching transistor in response to the output signal, said control transistor means turning ON and OFF in response to the output signal having the first level and the second level, respectively; and

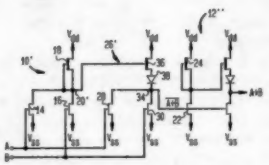
input transistor means, operatively connected between said first power source and said control transistor means and operatively connected to said input terminal, for controlling said switching transistor in response to the input signal, said input transistor means turning ON and OFF in response to the input signal having the first level and the second level, respectively, said switching transistor being turned ON only when said control and input transistor means are ON and provide a base current thereto.

4,716,311

DIRECT COUPLED FET LOGIC WITH SUPER BUFFER OUTPUT STAGE

William H. Davenport, Hillsboro; Gary D. McCormack, and George S. LaRue, both of Beaverton, all of Oreg., assignors to TriQuint, Beaverton, Oreg.

Filed Apr. 25, 1985, Ser. No. 726,864
Int. Cl.[4] H03K *19/017, 17/16, 19/094, 19/12*
U.S. Cl. 307—448 **4 Claims**



1. An integrated logic circuit comprising a direct coupled, FET logic input stage having:

(a) a depletion-mode FET structure having a gate, a source and a drain, the drain being connected to a first reference potential level and the gate and source being connected together, and

(b) a first enhancement mode FET structure having at least one gate, a source and a drain, the drain being connected to the source of the depletion-mode FET structure, the source being connected to a second, lower reference potential level and the gate being connected to receive an input logical signal,

and a super buffer logic output stage having:

(c) a second enhancement mode FET structure that is essentially identical to the first enhancement mode FET structure, the source of the second enhancement mode FET structure being connected to said second, lower reference potential level and the gate of the second enhancement mode FET structure being connected to the gate of the first enhancement mode FET structure, and

(d) a controllable current source connected to the source of the depletion-mode FET structure and to the drain of the second enhancement mode FET structure, for providing drain current to the second enhancement mode FET structure when the drain of the first enhancement mode FET structure exceeds a predetermined potential level and depriving the second enhancement mode FET structure of drain current when the drain of the first enhancement mode FET structure is below said predetermined potential level and wherein the controllable current source comprises a diode and a second depletion-mode FET structure, the gate of the second depletion-mode FET structure being connected to the source of the first-mentioned depletion-mode FET structure, the drain of the second depletion-mode FET structure being connected to the first reference potential level and the source of the second depletion-mode FET structure being connected through said diode to the drain of the second enhancement mode FET structure.

4,716,312

CMOS LOGIC CIRCUIT

Carver A. Mead, and John C. Wawrzynek, both of Pasadena, Calif., assignors to California Institute of Technology, Pasadena, Calif.

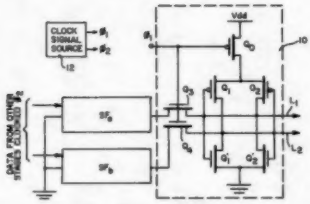
Continuation of Ser. No. 731,849, May 7, 1985, abandoned. This application Apr. 27, 1987, Ser. No. 47,492
Int. Cl.[4] H03K *19/096, 17/284, 17/693*
U.S. Cl. 307—475 **7 Claims**

1. An integrated circuit comprised of two set-reset circuits, a first set-reset circuit and a second set-reset circuit, each comprised of two cMOS inverters connected in parallel to a

source of power by at least one power-down MOS transistor of a type chosen from a group consisting of n-channel and p-channel MOS transistors, each of said cMOS inverters comprising

a first MOS transistor of the same n- or p-channel type as said power-down transistor connected directly to said power-down transistor and a second MOS transistor of the n- or p-channel type not chosen for said power-down transistor connected in series with said first MOS transistor, an output terminal at a junction between the first and second series transistors, an input terminal connected to the gate of each of said first and second series transistors, and

two signal-pass MOS transistors of the same type as said second MOS transistor of each MOS inverter, one signal-pass transistor connected as a series switch in a first signal line for receiving a data bit SF_a connected to the input terminal of one cMOS inverter and the output terminal of



the other cMOS inverter, and the other signal-pass transistor connected as a series switch in a second signal line for receiving a data bit SF_b connected to the input terminal of the other cMOS inverter and the output terminal of the one cMOS inverter, whereby said two cMOS inverters are directly cross-coupled, input to output, and the input to each is gated by a separate one of said pass transistors,

a source of first and second nonoverlapping phase clock signals, said first phase clock signals being connected to the gates of said power-down and signal-pass transistors of said first set-reset circuit, and said second phase clock signals being connected to the gates of said power-down and signal-pass transistors of said second set-reset circuit,

Boolean logic means for independently producing said data bits SF_a and SF_b, whereby monodirectional transfer of data bits SF_a and SF_b into said second set-reset circuit in response to one of said clock signals is effected according to the following table

SF_a	SF_b	q^{n+1}
0	0	q^n
0	1	0
1	0	1
1	1	x

where x indicates the new state q^{n+1} is uncertain, wherein output terminals of said first set-reset circuit are coupled to pass transistors of said second set-reset circuit by two separate switching functions comprised of MOS transistors of the same type as said pass transistors, said MOS transistors of said switching functions having their gates connected to receive data bits, a separate one of said switching functions being connected to each pass transistor to provide current paths between circuit ground and said pass transistors under control of data signals, and wherein at least one of said switching functions is comprised of at least three transistors, one transistor connected in series with a second transistor, and a third transistor connected in parallel with one of said transistors to provide a series-parallel network of transistors between circuit ground and said pass transistors.

4,716,313
PULSE DRIVE CIRCUIT

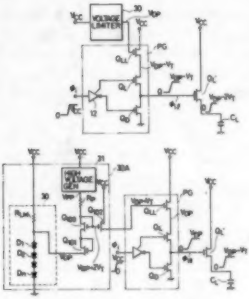
Ryoichi Hori, Nishitama; Kiyoo Itoh, Higashikurume, and Jun Etoh, Hachioji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 620,894, Jun. 15, 1984, abandoned. This application Jun. 3, 1987, Ser. No. 58,617

Claims priority, application Japan, Jun. 15, 1983, 58-105710

Int. Cl.[4] H03K *5/02, 17/08, 17/28, 17/284*

U.S. Cl. 307—475 **9 Claims**



1. A semiconductor circuit comprising:

voltage limiter means for limiting a supply voltage to a predetermined primary voltage, wherein the voltage level of said primary voltage is equal to the voltage level of said supply voltage when said voltage level of the supply voltage is below a predetermined voltage level, and further wherein the voltage level of said primary voltage varies in accordance with said voltage level of said supply voltage with a gradient of change less than 1.0 when said supply voltage is above said predetermined voltage level;

a pulse generating means for generating output pulses according to an input signal, wherein said pulse generating means is supplied with said primary voltage from the voltage limiter means and is also suppiied with the supply voltage, and further wherein the output pulses have a voltage level which is limited by said predetermined primary voltage supplied from said voltage limiter means; and

driver means coupled to receive said supply voltage and said output pulses for driving a capacitance load from a first voltage level to a second voltage level according to said output pulses of the pulse generating means, wherein the capcitance load is supplied with the second voltage from the supply voltage limited by the driver means according to the output pulses.

4,716,314
INTEGRATED CIRCUIT

Cornelis Mulder, Eindhoven, and Henricus E. J. Wulms, Eindhoven, both of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 6, 1975, Ser. No. 602,473

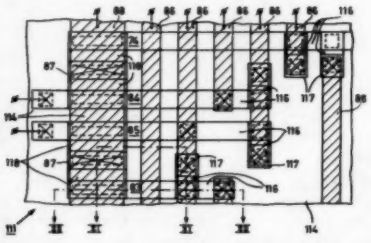
Claims priority, application Netherlands, Oct. 9, 1974, 7413264

Int. Cl.[4] H01L *27/04;* **H03K** *19/091*

U.S. Cl. 307—477 **26 Claims**

22. An integrated circuit comprising a common semiconductor body portion, said body portion comprising plural gate circuits each comprising at least one inverter transistor having emitter and base zones and at least one collector, and a complementary transistor connected to the inverter transistor for biasing same and having emitter, base and collector zones with the complementary transistor having its collector zone connected to the inverter transistor base zone, and each gate circuit having means connecting the complementary transistor base zone and the inverter transistor emitter zone in a d.c. path, said inverter transistors being arranged along substantially

parallel rows with all the inverter transistor collectors of the same gate circuit being located along the same row and wherein at least some of the gate circuits occupy different lengths in the row direction, means for interconnecting inverter transistor collectors and base zones of different gate circuits located in different rows to form desired logic, said inverter transistor collector and base zone interconnecting means comprising a group of elongated signal tracks substantially all of which extend substantially their entire length in mutually parallel straight lines and over the body substantially transversely to the row directions, said signal-track-interconnected collectors in different rows being located under the interconnecting signal track, at least plural tracks in the group of signal tracks interconnecting gate circuits in non-adjacent rows and crossing over at least one gate circuit in an interven-



ing row, a plurality of said gate circuits each having connections to said signal tracks that are spaced apart in the row direction by distances that are different from the spacings of signal track connections to other gate circuits, the biasing complementary transistor emitter zones being located along a column extending parallel to and located alongside the said group of signal tracks, and means for isolating adjacent rows of inverter transistors, wherein the body comprises a surface layer of a first type conductivity and of given conductivity on a substrate having at least one region of first type conductivity but of higher conductivity than the given conductivity, the inverter transistor base zones being second type locally overdoped zones located above and adjoining said higher conductivity one region and the second type doping profile in the inverter transistor base zones decreases from the said one region towards the surface of the surface layer.

4,716,315

TEMPERATURE COMPENSATION APPARATUS FOR AN ELECTRICAL CIRCUIT

Isaac M. Bell, Indianapolis, Ind., assignor to RCA Corporation, Princeton, N.J.

Filed Oct. 29, 1986, Ser. No. 924,316

Int. Cl.[4] G01K *7/24*; H03K *17/14*

U.S. Cl. 307—491 **11 Claims**

1. Apparatus for compensating a temperature dependent characteristic of a semiconductor device having a thermal time constant, said apparatus including:

a source of operating potential coupled to said semiconductor device;

a compensation circuit coupled to said source of operating potential and exhibiting an electrical time constant approximating said thermal time constant of said semiconductor device;

means for deriving from said compensation circuit a control signal exhibiting said electrical time constant; and

means for coupling said control signal to said semiconductor device to alter said characteristic of said semiconductor device in a direction opposite to a direction produced by temperature variations.

4,716,316

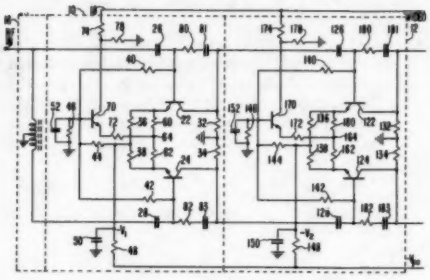
FULL WAVE, SELF-DETECTING DIFFERENTIAL LOGARITHMIC RF AMPLIFIER

Dennis P. Colin, Beverly, Mass., assignor to Varian Associates, Inc., Palo Alto, Calif.

Continuation of Ser. No. 698,204, Feb. 4, 1985, abandoned. This application May 20, 1987, Ser. No. 53,604

Int. Cl.[4] G06G *7/24*

U.S. Cl. 307—492 **4 Claims**



1. A logarithmic rf amplifier comprising:

means for receiving a first rf signal;

means for generating a second rf signal from said first rf signal, said second rf signal being said first rf signal shifted in phase by 180°;

a first amplifier stage comprising

means, coupled to said means for receiving and to said means for generating, for deriving a first output signal, a second output signal and a third signal from said first rf signal and said second rf signal, said first output signal being an amplified representative of said first rf signal, said second output signal being an amplified representative of said second rf signal and said third signal being a full wave rectification of said first rf signal, and

means, responsive to said third signal, for providing a first video signal representative of said third signal;

a second amplifier stage comprising

means, responsive to said first output signal and said second output signal, for providing a fourth signal, said fourth signal being a full wave rectification of said first output signal, and

means, responsive to said fourth signal, for providing a second video signal representative of said fourth signal; and

means for summing said first video signal and said second video signal.

4,716,317

CONTROL METHOD FOR AN INTEGRATED CIRCUIT USING A THREE-LEVEL CLOCK PULSE SIGNAL

Alphons F. E. B. Spierings, Breda, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Sep. 22, 1986, Ser. No. 910,104

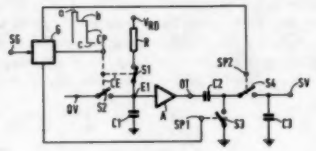
Claims priority, application Netherlands, Oct. 21, 1985, 8502860

Int. Cl.[4] H04N *5/21*

U.S. Cl. 307—520 **2 Claims**

1. A control method for an integrated circuit having a common switching electrode for controlling at least two oppositely-switchable transistors, which are operative in the integrated circuit for transferring an information charge or for performing a resetting operation, respectively, a connection of the switching transistors being coupled to a capacitance for receiving the information charge and for performing the resetting operation under the control of a clock pulse signal occurring at the switching electrode, comprising the step of providing the

clock pulse signal with three signal levels, a first clock pulse signal level at which the reset transistor is conducting and the charge transfer transistor is non-conducting, a subsequent



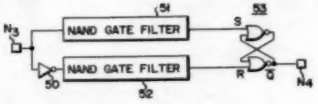
second clock-pulse signal level at which the two transistors are non-conducting and a subsequent third clock pulse signal level at which the charge transfer transistor is conducting and the reset transistor is non-conducting.

4,716,318

LOW PASS FILTER FORMED IN AN INTEGRATED CIRCUIT

Hideharu Koike, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 12, 1986, Ser. No. 838,708
Claims priority, application Japan, Mar. 13, 1985, 60-49974
Int. Cl.[4] H03K *17/28*
U.S. Cl. 307—520 **2 Claims**



1. A low pass filter apparatus formed in an integrated circuit comprising:

an input terminal of said apparatus;

an output terminal of said apparatus;

a first low pass filter circuit including

a first low pass filter circuit input terminal connected to said input terminal of said apparatus,

a first low pass filter circuit output terminal,

a plurality of series connected NAND gates connected between said first low pass filter circuit input terminal and said first low pass filter circuit output terminal, the first input terminal of each of said NAND gates being directly connected to said first low pass filter circuit input terminal,

an even number of inverters connected in series between said first low past filter circuit input terminal and the second input terminal of the first of said series connected NAND gates,

an odd number of inverters connected between the output terminal of each of said series connected NAND gates and the second input terminal of the following NAND gate of said series connected NAND gates, and

an odd number of inverters connected between the output terminal of the last NAND gate of said series connected NAND gate and said first low pass filter circuit output terminal; a second low pass filter circuit including

a second low pass filter circuit input terminal connected to said input terminal of said apparatus,

a second low pass filter circuit output terminal,

a plurality of series connected NAND gates connected between said second low pass filter circuit input terminal and said second low pass filter circuit output terminal, the first input terminal of each of said NAND gates being directly connected to said second low pass filter circuit input terminal,

an even number of inverters connected in series between said second low pass filter circuit input terminal and the second input terminal of the first of said series connected NAND gates,

an odd number of inverters connected between the output terminal of each of said series connected NAND gates and the second input terminal of the following NAND gate of said series connected NAND gates, and

an odd number of inverters connected between the output terminal of the last NAND gate of said series connected NAND gates and said second low pass filter circuit output terminal;

an inverter inserted between said input terminal of said apparatus and said second low pass filter circuit input terminal; and

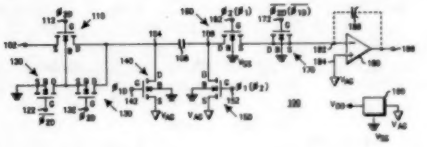
a set/reset type flip-flop circuit having a set input terminal connected to said first low pass filter circuit output terminal, a reset input terminal connected to said second low pass filter circuit output terminal, and an output terminal connected to said output terminal of said apparatus.

4,716,319

SWITCHED CAPACITOR FILTER FOR LOW VOLTAGE APPLICATIONS

Michael E. Rebeschini, Hanover Park, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Aug. 4, 1986, Ser. No. 892,534
Int. Cl.[4] H03K *5/00*; H03F *1/02*
U.S. Cl. 307—520 **9 Claims**



1. A switched capacitor circuit having an input node, an output node, and a reference node, said circuit comprising in combination:

a capacitor having first and second plates;

a gain device having an input port and an output port, said output port coupled to said circuit output node;

first switch means responsive to a first control signal for coupling said input node to said capacitor first plate, said first switch means being a switched-tub MOS transistor;

second switch means responsive to a second control signal for coupling said capacitor first plate to said reference node;

third switch means responsive to a third control signal for coupling said capacitor second plate to said reference node;

fourth switch means responsive to a fourth control signal for coupling said capacitor second plate to said gain device input port, said third and fourth switch means being single MOS transistors of the same conductivity type; and

clock means for providing said control signals to each of said switch means, said first and second control signals being delayed in time with respect to said third and fourth control signals such that the opening of each of said switch means coupled to said capacitor second plate occurs before the opening of each corresponding switch means not coupled thereto,

whereby switching said first switch means does not produce charge injection into said gain device input port.

4,716,320
CMOS SENSE AMPLIFIER WITH ISOLATED SENSING NODES

Hugh P. McAdams, Houston, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Jun. 20, 1986, Ser. No. 876,624
Int. Cl.[4] H03K *3/356, 17/04*
U.S. Cl. 307—530 **16 Claims**

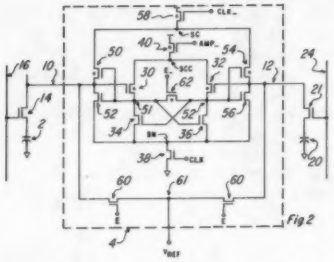


Fig 2

1. A sense amplifier circuit for sensing the differential voltage between a first bit line and a second bit line, said first and second bit lines each having a capacitance, comprising:

a first coupling means for coupling said first bit line to a first sensing node in such a manner that the voltage of said first sensing node is responsive to the voltage of said first bit line and in such a manner that the capacitance of said first bit line is isolated from said first sensing node;

a second coupling means for coupling said second bit line to a second sensing node in such a manner that the voltage of said second sensing node is responsive to the voltage of said second bit line and in such a manner that the capacitance of said first bit line is isolated from said first sensing node;

amplifying means for amplifying the differential voltage between said first sensing node and said second sensing node, responsive to said first bit line and said second bit line being at different voltages;

a first driving means for driving said first bit line to a voltage responsive to said amplifying means, said driving means coupled between said first bit line and said amplifying means in such a manner that the capacitance of said first bit line is isolated from said amplifying means for either polarity of differential voltage; and

a second driving means for driving said second bit line to a voltage responsive to said amplifying means, said driving means coupled between said second bit line and said amplifying means in such a manner that the capacitance of said second bit line is isolated from said amplifying means for either polarity of differential voltage.

4,716,321
LOW NOISE, HIGH THERMAL STABILITY ATTENUATOR OF THE INTEGRATABLE TYPE

Pietro Erratico, Milan, Italy, assignor to SGS Microelettronica S.p.A., Catania, Italy

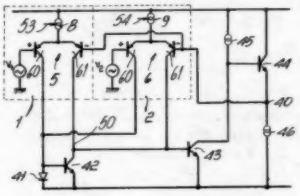
Filed Feb. 10, 1986, Ser. No. 827,921
Claims priority, application Italy, Feb. 20, 1985, 19570 A/85
Int. Cl.[4] H03K *5/08, 17/62;* **H03H** *7/24*
U.S. Cl. 307—540 **6 Claims**

1. A low noise, high thermal stability attenuator of the integratable type, comprising:

a ladder-type attenuating network having an attenuating network input receiving a signal to be attenuated and a plurality of intermediate taps defining each an attenuating network output providing a different predetermined attenuation level output signal and a controlled switching element including a plurality of amplifying means, a correspondent plurality of biasing means and an amplifying output stage.

each said amplifying means having at least one first attenuated signal input, one second bias input and an amplifying means output,

each said first attenuated signal input of said amplifying means being connected to a respective one of said attenuating network outputs, each said second bias input of said amplifying means being connected to a respective one of said biasing means and said amplifying means outputs of



said amplifying means being connected together and defining a summing knot,

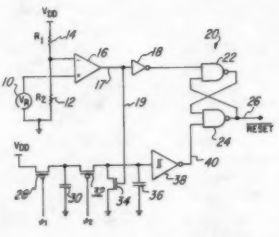
each said biasing means having a switching input, said switching inputs of said biasing means receiving a control signal to operatively switch on only one of said biasing means and thereby only a respective one of said amplifying means of said plurality,

said amplifying output stage having an output stage input connected to said summing knot and an output stage output defining an attenuator output.

4,716,322
POWER-UP CONTROL CIRCUIT INCLUDING A COMPARATOR, SCHMITT TRIGGER, AND LATCH

Sebastiano D'Arrigo, Houston, Tex.; Giuliano Imondi, Rieti, and Sossio Vergara, Frattamaggiore, both of Italy, assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Mar. 25, 1986, Ser. No. 843,532
Int. Cl.[4] H03K *17/22, 17/30*
U.S. Cl. 307—592 **5 Claims**



1. A circuit for generating an enable signal responsive to the voltage of a power supply during power-up, comprising:

a reference voltage generator, connected to said power supply, for generating a reference voltage;

a comparator, coupled to said reference voltage generator and to said power supply, for for generating a voltage at its output corresponding to the difference between said power supply voltage and the reference voltage;

capacitor means coupled to said power supply and to said output of said comparator such that in response to the voltage of said output of said comparator indicating that said power supply voltage exceeds a predetermined value, said capacitor means is enabled to charge up from said power supply;

a trigger circuit having an input coupled to said capacitor means and responsive to the voltage on the latter to reversibly change its output voltage;

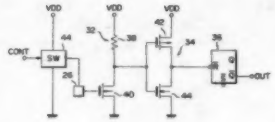
a latch having a set input coupled to said output of said comparator, and having a reset input coupled to the output of said trigger circuit so that, responsive to said power supply voltage exceeding said predetermined value during power-up, the output of said latch generates an enable signal, and so that, responsive to said power supply voltage thereafter falling below said predetermined value, the output of said latch generates a disable signal.

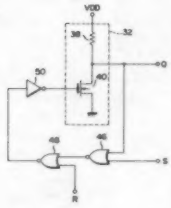
4,716,323

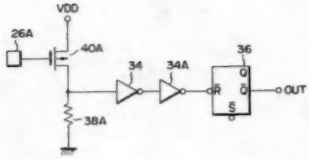
POWER VOLTAGE DROP DETECTING CIRCUIT

Tetsuro Wada, Yokohama, and Yasuo Ohkubo, Tokyo, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Apr. 25, 1986, Ser. No. 855,595
Claims priority, application Japan, Apr. 27, 1985, 60-91419; Jan. 13, 1986, 61-4788
Int. Cl.[4] H03K *17/284, 17/22, 17/20, 17/30*
U.S. Cl. 307—594 **7 Claims**







1. A power voltage drop detecting circuit formed on an LSI chip accommodated in a package having pins, said circuit comprising:

first and second power source terminals supplied with power voltage and set at a positive potential and a ground potential, respectively;

a voltage dividing circuit, having a resistive means and a MOS transistor, for dividing the power voltage, said resistive means being connected at one end to said first power source terminal directly and at the other end to said second power source terminal via the current path of said MOS transistor;

a CMOS inverter for producing an output voltage according to the output voltage of said voltage dividing circuit;

a control pad connected to a pin of said LSI chip package and to a gate of said MOS transistor and set at different potentials in test and detection modes, respectively; and

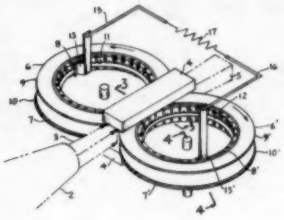
a CMOS RS flip-flop having a reset terminal responsive to an inverted output signal of said CMOS inverter.

4,716,324

MAGNETOHYDRODYNAMIC ELECTRICAL POWER GENERATION

Nicholas Sclufer, 725 Dodds La., Gladwyne, Pa. 19035

Filed Nov. 5, 1986, Ser. No. 932,079
Int. Cl.[4] H02K *44/00*
U.S. Cl. 310—11 **6 Claims**



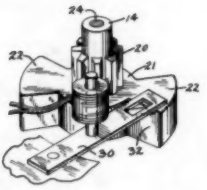
1. A magnetohydrodynamic electrical energy generating unit comprising a source of high temperature gaseous fluid flowing in a stream, means maintaining a magnetic field comprising lines of force penetrating said stream and extending normal to the direction of flow of said stream, and movable means defining a portion of a confining structure restricting the flow of said stream through said magnetic field and adapted for progressive movement of successive portions thereof into and out of said field substantially in parallelism with a plane of the direction of flow of said stream.

4,716,325

DISENGAGEABLE ONE-WAY MECHANISM FOR SYNCHRONOUS MOTORS

William N. Roos, Colgate, Wis., assignor to Autotrol Corporation, Milwaukee, Wis.

Filed Nov. 6, 1986, Ser. No. 927,573
Int. Cl.[4] H02K *7/10*
U.S. Cl. 310—41 **5 Claims**



1. In combination with a bidirectional a.c. synchronous motor having a casing and a motor shaft disposed in an opening in the casing, a disengageable one-way mechanism comprising:

an abutment mounted to the motor shaft for rotation therewith;

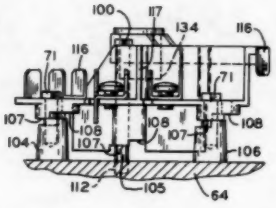
a flexible arm mounted to the casing and including a finger normally disposed in the path of said abutment and adapted to block said abutment when the motor shaft rotates in one direction and to ride over said abutment when the motor shaft rotates in the opposite direction; and

means responsive to the energization of said motor and including a time delay to move said arm to remove the finger from the path of the abutment after the motor shaft has begun to rotate in said opposite direction and for as long as the motor is energized.

4,716,326
ELECTRIC MOTOR WITH ADJUSTABLE SWITCH LOCATION

Lynn E. Fisher, Fort Wayne, Ind., assignor to General Electric Company, Fort Wayne, Ind.

Division of Ser. No. 522,620, Aug. 12, 1983, Pat. No. 4,593,163. This application May 16, 1986, Ser. No. 864,048
Int. Cl.[4] H02K *5/26*
U.S. Cl. 310—89 **29 Claims**

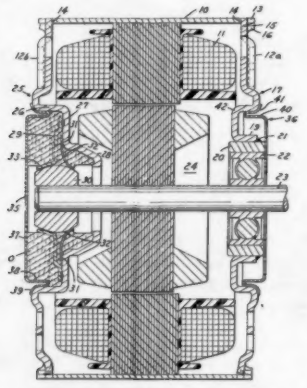


1. An electric motor comprising a rotatable shaft, a centrally disposed, shaft mounted, axially movable switch operating mechansm conjointly rotatable with said shaft, and a winding energization controlling switch assembly actuated in response to the axial movement of said switch operating mechanism and including a switch actuator, a switch arm support, at least two elongate switch arms supported on said support, and at least one contact carried by each of said switch arms, wherein said support is fastened to a motor mounting surface, and said switch actuator and switch arms are positioned so that a line passing through said switch arms and switch actuator is essentially collinear with the axis of said shaft and thus overlies said operating mechanism whereby maximum utilization of mechanism travel may be utilized in effecting movement of said switch actuator.

4,716,327
ELECTRIC MOTOR BEARING

Thomas W. Stone, Owosso, Mich., assignor to Universal Electric Company, Owosso, Mich.

Filed Nov. 5, 1986, Ser. No. 927,521
Int. Cl.[4] H02K *5/16*
U.S. Cl. 310—90 **5 Claims**

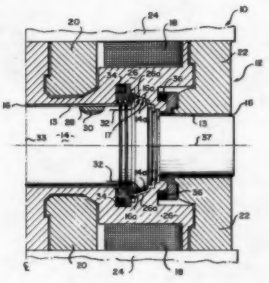


1. An electric motor comprising
a sheet metal shell having an axis,
a stator supported by said shell,
a shaft,
a rotor mounted on said shaft,
longitudinally spaced end members,
said end members being fastened to the shell in a manner such that the end members are accurately positioned longitudinally of the shell and the center of the end members is accurately positioned relative to the axis of the shell,
one of said end members rotatably supporting a portion of said shaft,
the other of said end members comprising a sheet metal member having an axially inwardly extending portion, an unpainted radial portion connected to the axial portion and a generally axially inwardly extending portion,
a bearing on said shaft,
a spring retainer engaging said radial portion of said other end member and having a plurality of radial fingers yieldingly engaging said bearing,
a bearing retainer welded to said unpainted radial portion of said end member, and defining a seat engaging said bearing,
an external oil catcher cover frictionally engaging the annular wall of said other end member and extending radially inwardly into overlying relation with said bearing member, and
oil retaining material positioned between said oil catcher cover and said bearing retainer and between said bearing retainer and said spring retainer and between said spring retainer and said generally axially inwardly extending portion of said end member.

4,716,328
MAGNETIC FIELD COMPENSATED LIQUID METAL CURRENT COLLECTOR FOR ACYCLIC GENERATOR

Manoj R. Shah, Latham; Henry G. Lenz, and William L. Bird, both of Scotia, all of N.Y., assignors to General Electric Company, Pittsfield, Mass.

Filed Jan. 2, 1986, Ser. No. 815,611
Int. Cl.[4] H02K *31/00*
U.S. Cl. 310—178 **2 Claims**



1. An acyclic dynamoelectric machine comprising, in combination:
A. a stator having a bore;
B. a rotor mounted for rotation about its axis within said bore and separated from said stator by an annular air gap;
C. a pair of axially spaced, solenoidal-shaped field windings for developing an excitation magnetic field;
D. a pair of current collectors, each said current collector being in radially underlying relation with a different one of said field windings and including opposed, conforming annular collector surfaces of said rotor and said stator separated by a segment of said air gap and liquid metal disposed within said air gap segment to conduct current between said stator and said rotor collector surfaces, said rotor and stator collector surfaces being disposed at a predetermined angle relative to said axis; and
E. solenoidal-shaped compensation means incorporated in said stator for shaping said excitation magnetic field in the regions of said current collectors such as to minimize field

components thereof normal to said stator and rotor collector surfaces, said compensation means including a separate pair of axially spaced trim coils associated with each said current collector, said trim coils of each said trim coil pair disposed in opposed, continuous flanking relation with said stator collector surface of the associated one of said current collectors and respectively energized with equal and opposite direct currents, whereby the net magnetic field contribution of said trim coils to said excitation field is practically zero.

4,716,329

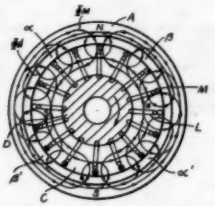
ARMATURE CONSTRUCTION FOR ELIMINATING ARMATURE REACTION IN ELECTRIC ROTATING MACHINES

Sang S. Oh, Seoul, Rep. of Korea, assignor to Jang Kyun Oh, Seoul, Rep. of Korea, a part interest

Continuation of Ser. No. 874,664, Feb. 2, 1979, abandoned, which is a continuation-in-part of Ser. No. 321,554, Jan. 5, 1973, abandoned. This application Jun. 24, 1980, Ser. No. 162,571

Int. Cl.⁴ H02K *1/10*

U.S. Cl. 310—183 **7 Claims**



1. Apparatus comprising rotor and stator means one of which is rotatable relative to the other, one of said means being a magnetized member and therefore having North and South poles, the other of said means comprising an armature, a first winding associated with at least one of said means and effecting a magnetic interaction between said rotor and stator means, a second winding at right angles to said first winding, said second winding being of closed loop configuration, and a non-magnetic means operatively positioned with respect to said second winding for cooperating therewith for the generating and positioning of counter flux for compensating armature reaction flux and thereby increasing efficiency, said rotor and stator means being concentric cylinders, the outer of which is a magnet and the inner of which is said armature, said first winding being a main coil wound on said armature, said non-magnetic means being associated with said armature, said first winding being of drum type, said armature being slotted to receive said main coil.

4,716,330

DC MOTOR WITH COMMUTATOR ROTOR

Marc Heyraud, La Chaux-de-Fonds, Switzerland, assignor to Asgalium S.A., Switzerland

Filed Nov. 5, 1985, Ser. No. 795,082

Claims priority, application European Pat. Off., Nov. 19, 1984, 84810559.9

Int. Cl.⁴ H02K *13/10*

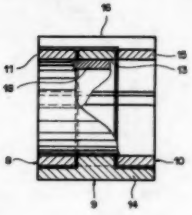
U.S. Cl. 310—233 **8 Claims**

1. A DC motor comprising:

a stator which includes a first number of pairs of poles regularly distributed around an axis; and

a rotor which includes a commutator and a plurality of coils, the number of said coils being a second number equal to the product of an integer higher than one and said first number;

said commutator comprising a plurality of integral rigid parts of a conducting metal, each of said integral rigid parts including an annular supporting portion and a group of elongated elements regularly distributed around said annu... supporting portion, the number of elongated elements in said group being equal to said first number of pairs of poles of said stator, and the number of integral rigid parts being equal to said second number of coils per pair of poles;



said annular supporting portions of said plurality of integral rigid parts being coaxial with the axis of said stator so that said elongated elements of said plurality of integral rigid parts are regularly distributed around said axis, said annular supporting portions being held in a fixed relationship with, spaced apart from and insulated from one another by insulating means.

4,716,331

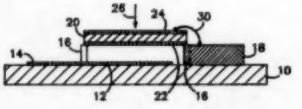
ELECTRICALLY VARIABLE PIEZOELECTRIC HYBRID CAPACITOR

Robert J. Higgins, Jr., Sunrise, Fla., assignor to Motorola Inc., Schaumburg, Ill.

Division of Ser. No. 814,868, Dec. 30, 1985, Pat. No. 4,675,960. This application Mar. 13, 1987, Ser. No. 25,430

Int. Cl.⁴ H01L *41/08*

U.S. Cl. 310—330 **9 Claims**



1. An electrically variable piezoelectric hybrid microelectronic circuit capacitor, comprising in combination:

a substrate;

a first capacitor plate formed on a surface of said substrate;

a ridge formed by a hybrid microelectronic circuit manufacturing process on said surface of said substrate, said ridge having an upper surface positioned a predetermined distance above said first capacitor plate;

an arch or dome shaped piezoelectric wafer connected to said upper surface of said ridge;

a second capacitor plate formed on a first surface of said piezoelectric wafer;

a first control plate formed on a second surface of said piezoelectric wafer.

4,716,332

PIEZOELECTRIC VIBRATOR

Hitoaki Hayashi, Tokyo, Japan, assignor to Asahi Dempa Co., Ltd., Tokyo, Japan

Filed Jun. 9, 1986, Ser. No. 872,014

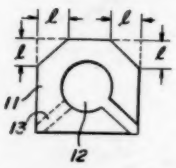
Claims priority, application Japan, Mar. 31, 1986, 61-70953

Int. Cl.⁴ H01L *41/08*

U.S. Cl. 310—368 **5 Claims**

1. In a piezoelectric vibrator vibrating at a third overtone frequency comprising a vibrating plate made of piezoelectric material and having opposite major surfaces, and a pair of electrodes applied on said major surfaces in opposition to each

other, the improvement wherein said vibrating plate comprises a substantially square plate having at least two adjacent corners cut off along oblique planes substantially perpendicular to said plate and spaced from an axis passing through a center of said plate, said plate has a center of gravity eccentric with



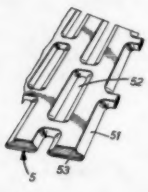
respect to a center of gravity [illegible] of said pairs of electrodes, and an impedance of the vibrator for said third overtone frequency is smaller than one-third of an impedance of a vibrator for a fundamental frequency, so that a fundamental vibration is suppressed and a third overtone vibration is enhanced.

4,716,333

SHADOW MASK FOR A COLOR CATHODE RAY TUBE

Tokita Kiyoshi, and Kondou Masayoshi, both of Saitama, Japan, assignors to Kabushiki Kaisha Toshiba, Japan

Filed Aug. 13, 1984, Ser. No. 640,390
Claims priority, application Japan, Aug. 16, 1983, 58-148843
Int. Cl.[4] H01J *29/80*
U.S. Cl. 313—402 **21 Claims**



1. A color cathode ray tube comprising:
an envelope having a neck portion and a panel portion;
electron gun means within said neck portion for emitting an electron beam directed toward said panel portion;
a plurality of colored phosphor stripes on a surface of said panel portion to emit colored light when struck by the electron beam; and
a shadow mask between said panel portion and said electron gun means to permit the electron beam to strike the correct color phosphor stripe while preventing the electron beam from striking another color phosphor stripe, said shadow mask comprising;
a. a major face containing a plurality of apertures,
b. a skirt portion extending from the periphery of said major face; and
c. a layer consisting essentially of a ceramic material bonded to said major face by heat treatment so that said shadow mask includes residual tensile stress.

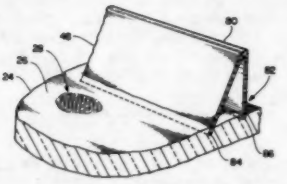
4,716,334

FACEPLATE ASSEMBLY FOR SECURING A TENSION MASK SUPPORT STRUCTURE TO A FACEPLATE

James R. Fendley, Arlington Heights, and Siegfried M. Greiner, Crystal Lake, both of Ill., assignors to Zenith Electronics Corporation, Glenview, Ill.

Filed Oct. 31, 1986, Ser. No. 925,424
Int. Cl.[4] H01J *29/07*
U.S. Cl. 313—407 **11 Claims**

1. A faceplate assembly for a color cathode ray tube comprising a glass faceplate having on its inner surface a centrally disposed phosphor screen, and a foil shadow mask mounted in tension on a mask support structure located on opposed sides of the screen, said mask support structure physically penetrating said faceplate for permanent, cementless anchoring of said



structure to said faceplate, with the embedment of said mask support structure being of such depth as to cause said structure to resist tensile forces created by said mask.

4,716,335

LUMINESCENT SCREEN AND LOW-PRESSURE MERCURY VAPOR DISCHARGE LAMP PROVIDED WITH SUCH A SCREEN

Evert D. Schutten, Roosendaal, and Johannus G. Verlijsdonk, Eindhoven, both of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 2, 1986, Ser. No. 869,750
Claims priority, application Netherlands, Jun. 4, 1985, 8501599
Int. Cl.[4] C09K *11/475*
U.S. Cl. 313—486 **4 Claims**

1. A luminescent screen provided with a luminescent layer which is applied to a carrier and which comprises a luminescent terbium-activated silicate having a cuspidine crystal structure, characterized in that the silicate corresponds to the formula $Y_{4-x-z-p}Ca_xM_z^{II}Tb_pSi_{2-y}Al_yO_{7+x+z+y}N_{2-x-z-y}$, where M^{II} represents at least one of the elements Mg, Sr and Ba, where the yttrium is replaceable up to at most 50 mol.% by at least one of the elements Gd and La and

$0 \leqq x \leqq 1.9$
$0 \leqq z \leqq 1.0$
$0 \leqq y \leqq 1.9$
$x+z+y \leqq 1.9$
$0.05 \leqq p \leqq 1.5$.

4,716,336

LUMINESCENT SCREEN AND LOW-PRESSURE MERCURY VAPOR DISCHARGE LAMP PROVIDED WITH SUCH A SCREEN

Evert D. Schutten, Roosendaal, and Johannus G. Verlijsdonk, Eindhoven, both of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 2, 1986, Ser. No. 869,749
Claims priority, application Netherlands, Jun. 4, 1985, 8501600
Int. Cl.[4] C09K *11/475*
U.S. Cl. 313—436 **8 Claims**

1. A luminescent screen provided with a luminescent layer which is formed on a carrier and which comprises a luminescent silicate having an apatite crystal structure, characterized in that the silicate corresponds to the formula:

$$Ln_{10-x-p-q}M_x^{II}Tb_pZr_q(SiO_4)_{6-y}(M^{III}O_4)_yO_x.$$
$$_{+y-q}N_{2-x-y+q},$$

where Ln represents at least one of the elements Y, La and Gd, M^{II} represents at least one of the elements Mg, Ca and Sr and M^{III} represents at least one of the elements A1 and B and where

$0 \leqq x \leqq 1.9$

$0 \leqq y \leqq 1.9$

$x+y \leqq 1.9$

$0 \leqq p \leqq 3$

$0 \leqq q \leqq x+y$

$0.1 \leqq p+q$.

4,716,337

FLUORESCENT LAMP

Cornelis Huiskes, and Evert D. Schutten, both of Roosendaal, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 6, 1987, Ser. No. 720

Claims priority, application Netherlands, Jan. 8, 1986, 8600023

Int. Cl.[4] H01J *61/44, 61/48*

U.S. Cl. 313—487 **8 Claims**

1. A low-pressure mercury vapour discharge lamp having a very satisfactory colour rendition, a colour temperature of emitted white light in the range from 2300 to 3300 K. and a colour point on or near the Planckian locus, said lamp having a gas-tight radiation emitting envelope containing mercury and a rare gas, and a luminescent layer comprising:

a. at least one luminescent alkaline earth metal halophosphate activated by trivalent antimony and by bivalent manganese with a colour temperature of the emitted radiation from 2900 to 5000 K.;

b. at least one luminescent material activated by bivalent europium having an emission maximum in the range from 470 to 500 nm and a half-value width of the emission band of not more than 90 nm;

c. a luminescent rare earth metal metaborate activated by trivalent cerium and by bivalent manganese and having a monoclinic crystal structure whose fundamental lattice is defined by the formula $Ln(Mg,Zn,Cd)B_5O_{10}$, in which Ln represents at least one of the elements ytrrium, lanthanum and gadolinium, and in which up to 20 mol. % of the B may be replaced by Al and/or Ga, which metaborate has a red Mn^{2+} emission; and

d. a luminescent aluminate activated by trivalent cerium and having a garnet crystal structure at least partly absorbing blue radiation at wavelengths below 480 nm, characterized in that the luminescent layer also comprises:

e. a green luminescing material activated by bivalent manganese having an emission maximum in the range from 510 to 535 nm.

4,716,338

ELECTRODE STRUCTURE FOR A CATHODE GLOW DISCHARGE SYSTEM

Yung Rungz, Room No. 503, 1st door, Beijing Huei Min Hospital Domitory, Beijing, China

Filed Sep. 3, 1985, Ser. No. 771,799

Claims priority, application China, May 15, 1985, 85103601

Int. Cl.[4] H01J *17/38, 1/90*

U.S. Cl. 313—619 **10 Claims**

1. An electrode structure in a glow discharge system used for nitride hardening of a workpiece, comprising:

an anode plate;

a cathode plate mounted opposite said anode plate and adapted to support said workpiece;

a conducting bar which passes through said anode plate and is connected to said cathode plate;

an insulating dielectric shroud extending between said anode

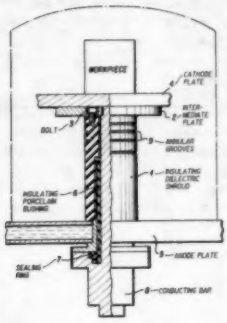


plate and said cathode plate and surrounding said conducting bar;

said shroud being in contact with said cathode plate and said anode plate so as to leave no gap therebetween and so that there are no exposed portions of said conducting bar between said cathode and anode plates.

4,716,339

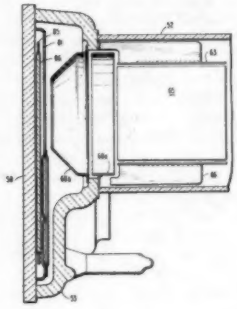
SPLIT DRIFT RING FOR FOCUS DEFLECTION IN LIGHT VALVES

Alfred G. Roussin, Syracuse, N.Y., assignor to General Electric Company, Princeton, N.J.

Filed Jul. 8, 1986, Ser. No. 883,214

Int. Cl.[4] H01J *29/46*

U.S. Cl. 315—15 **12 Claims**



1. An improved electrostatic electron optical system for generating an electron beam and imaging an electron object formed by an aperture having a rectangular cross-section and sweeping said beam over a scanned raster area while maintaining the magnification of the horizontal and vertical image dimensions, and focus surface over the entire scanned area comprising:

a focus deflection electrode assembly of rectangular cross-section having two pairs of parallel plates;

at least two substantially symmetrical, cylindrical electrodes in spaced apart relation along the axis of said focus and deflection electrode assembly; and

a beam landing electrode, said at least two cylindrical electrodes being operated at different voltages to produce a plurality of electrostatic lense which provide off-axis

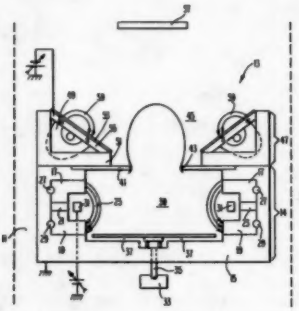
deflection defocusing correction, primary focusing and magnification control between the focus and deflection electrode assembly and the first of the at least two cylindrical electrodes, separate symmetrical electron beam secondary focusing control between the first and the second of the at least two cylindrical electrodes, and secondary control over electron beam magnification between the second cylindrical electrode and the beam landing electrode.

4,716,340

PRE-IONIZATION AIDED SPUTTER GUN

Kon J. Lee, Atlanta, Ga., and Anthony Musset, Haddon Heights, N.J., assignors to Denton Vacuum Inc, Cherry Hill, N.J.

Filed Dec. 10, 1985, Ser. No. 807,345
Int. Cl.[4] H01J *7/24*; H05H *1/00*
U.S. Cl. 315—111.41 **8 Claims**



1. A pre-ionization aided sputtering gun comprising in combination cold cathode plasma source means providing external plasma and having a substantially large aperture means therein, said substantially large aperture means disposed to enable plasma including partially ionized gas to pass from said cold cathode plasma source means; magnetron means having a plasma chamber formed therein and connected to electrical power means to provide EXB forces within said plasma chamber; and means mounting said magnetron means in close proximity to said cold cathode plasma source means and disposing said magnetron means such that plasma including partially ionized gas passing from said cold cathode plasma source means is passed into said plasma chamber of said magnetron means, and said means mounting said magnetron means effecting an electrical insulation between said cold cathode plasma source means and said magnetron means whereby when plasma including partially ionized gas is passed from said cold cathode plasma source into said plasma chamber of said magnetron means further ionization of said plasma takes place in said plasma chamber.

4,716,341

DISPLAY DEVICE

Osamu Oida, and Tsunekiyo Iwakawa, both of Tokyo, Japan, assignors to NEC Corporation, Japan

Filed Jan. 7, 1986, Ser. No. 816,801
Claims priority, application Japan, Jan. 7, 1985, 60-572
Int. Cl.[4] G09G *3/10*
U.S. Cl. 315—169.4 **10 Claims**

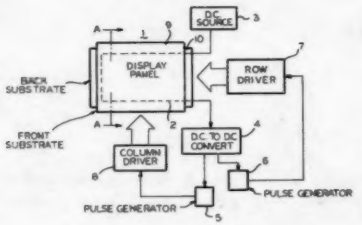
1. A display device driven by a high driving voltage comprising:

a display panel having display electrodes;

a conductor line provided on the surface of said display panel;

a high voltage producing means connected to one end of said conductor line for applying a high voltage to said display electrodes; and

a low voltage source connected to the other end of said



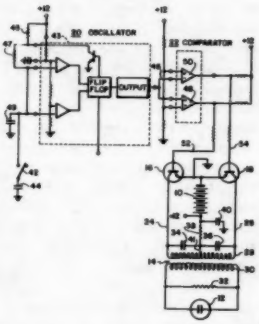
conductor line for operating said high voltage producing means, whereby an application of said high voltage to said display electrodes is terminated when said conductor line is broken or cut as a result of damage of said display panel.

4,716,342

POWER CIRCUIT FOR SPECTRAL ANALYSIS GASEOUS DISCHARGE LAMPS

John T. McCaffrey, Hamden, Conn., assignor to The Perkin-Elmer Corporation, Norwalk, Conn.

Filed Dec. 5, 1985, Ser. No. 804,948
Int. Cl.[4] H05B *37/02, 39/04, 41/36*; 363 *23-26*, 133, 134; 356 *313*; 315 *DIG. 5, DIG. 7, 306, 307, 219*
U.S. Cl. 315—219 **17 Claims**

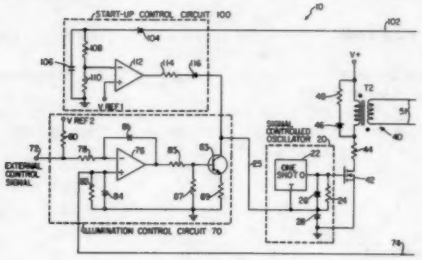


1. A high frequency power circuit for a spectral analysis instrument gaseous discharge lamp comprising an inverter arranged for connection to a source of d.c. power to be inverted, said inverter including a transformer having a center-tapped primary winding, separate controllable switching devices connected to the respective ends of said primary winding of said transformer and both being arranged to be connected in common to one output terminal of the d.c. power source, the center tap of said transformer primary winding being arranged for connection to the other output terminal of the d.c. power source, said transformer having a laminated silicon steel core, said transformer including a secondary winding arranged for connection across the input terminals of a gaseous discharge lamp, a control circuit including an oscillator connected to control conduction by said separate controllable switching devices in alternating sequence at a desired frequency of operation.

4,716,343
CONSTANT ILLUMINATION, REMOTELY DIMMABLE ELECTRONIC BALLAST

John Lindquist, Larkspur, Calif., assignor to Universal Manufacturing Corporation, Paramus, N.J.

Filed Nov. 15, 1985, Ser. No. 798,265
Int. Cl.[4] H05B *37/00*
U.S. Cl. 315—307 **17 Claims**



1. In a solid-state ballast for discharge lamps, the ballast being of the type including an oscillator providing an operating signal to the discharge lamp load through a driver, the improvement comprising:

said oscillator being a signal controlled oscillator having a frequency control input and providing an output signal with a frequency determined by the value of a signal applied at said frequency control input, wherein said signal controlled oscillator comprises:

a one-shot circuit having an output providing a pulse of predetermined duration and an input for triggering the initiation of said pulse;

delay means connecting said output of said one-shot to the input thereof; and

means coupling said one-shot output as the output signal of said oscillator;

means sensing the instantaneous current flowing within the load for producing a control signal representing this load current; and

means for coupling said control signal to said frequency control input.

4,716,344
MICROPROCESSOR CONTROLLED LIGHTING SYSTEM

Darrel E. Newell, Bayport, and Mary C. O'Brien, Stillwater, both of Minn., assignors to Micro Research, Inc., Bayport, Minn.

Filed Mar. 20, 1986, Ser. No. 841,790
Int. Cl.[4] H05B *37/00, 39/00, 41/00*
U.S. Cl. 315—312 **8 Claims**

1. A system for controlling the positioning of a plurality of lighting instruments, comprising:

(a) yoke means for individually suspending each of said lighting instruments from a stationary frame;

(b) first motor means attached to each of said yoke means and coupled in driving relation with said lighting instruments for rotating said instruments in a vertical plane;

(c) second motor means coupled in driving relation to each of said yoke means for rotating said lighting instruments in a horizontal plane;

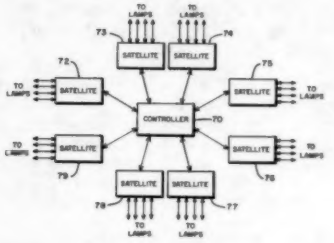
(d) at least one satellite module means including a microprocessor having a serial data input port, a serial data output port and an input/output port;

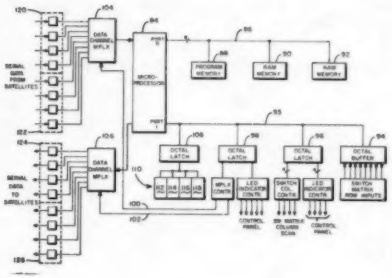
(e) motor control means responsive to digital signals and coupled to said input/output port of said microprocessor means in said satellite module and to said first and second motor means for driving said first and second motor means in accordance with digital information received over said serial data input port;

(f) shaft encoder means driven by said first and second motor means for developing a digital pulse count indicative of the distance the shafts of said first and second motor means have moved from a given starting position;

(g) controller module means including microprocessor means and memory means for storing a program of instructions and lamp positioning preset data at addressable locations therein, said preset data comprising numerical counts indicative of position within the field of movement of said lighting instrument, said microprocessor means in said controller module having a serial data input port, a serial data output port and an input/output port;

(h) means coupling said serial data input port of said microprocessor means in said controller module to said serial data output port of said microprocessor means in said





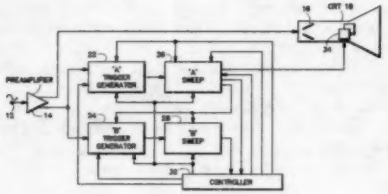
satellite module and said serial data input port of said microprocessor means in said satellite module to said serial data output port of said microprocessor means in said controller module; and

(i) keyboard means coupled to said input/output port of said microprocessor means in said controller module for first entering data into said microprocessor means in said controller module by moving said lighting instruments to desired orientations and subsequently entering said lighting instruments positioning data corresponding to said desired orientations into said memory means in said controller module as a preset data block when said system is operating in a "design" mode and for selecting presets from said preset data blocks stored in said memory means representing desired positions for said plurality of lighting instruments when said system is operating in a "run" mode.

4,716,345
AUTOMATIC PULSE DISPLAY

Gordon W. Shank, Portland, Oreg., and Earl P. Eason, Livermore, Calif., assignors to Tektronix, Inc., Beaverton, Oreg.

Filed Sep. 19, 1986, Ser. No. 909,343
Int. Cl.[4] G01R 13/28; H04N 3/223
U.S. Cl. 315—392 7 Claims



1. In an oscilloscope having dual time sweeps and trigger generators, a method of automatically expanding the display of a repetitive input signal having a pulse portion of less than a specified duty factor, comprising:

setting the speed of the time sweep for the sweep signal to contain a predetermined number of input signal cycles;

increasing the speed of the time sweep to expand the signal cycles, the speed increased by a factor sufficient to place less than a single signal cycle within the sweep signal and an expanded pulse portion of greater than the specified duty factor outside the sweep signal;

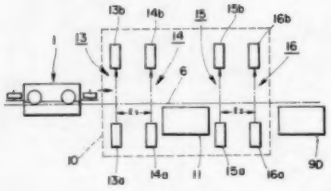
detecting whether an expanded pulse is contained within the faster sweep signal; and

displaying the expanded pulse if so contained.

4,716,346
CONVEYING APPARATUS

Yukito Matsuo, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Japan

Filed Dec. 12, 1985, Ser. No. 808,114
Claims priority, application Japan, Dec. 13, 1984, 59-263516
Int. Cl.[4] H02K 41/00
U.S. Cl. 318—38 18 Claims



1. A conveying apparatus for moving a carriage loaded with an article in a conveying direction along a curve of a track under the influence of inertia, comprising:

a plurality of driving means disposed along said track in a spaced relation to impart forward or reverse propulsive force to said carriage,

one speed detecting means for detecting the speed of the carriage before the carriage enters a preselected one of the driving means, said preselected driving means being located upstream of the curve with respect to the conveying direction,

mass detecting means for detecting the mass of the carriage,

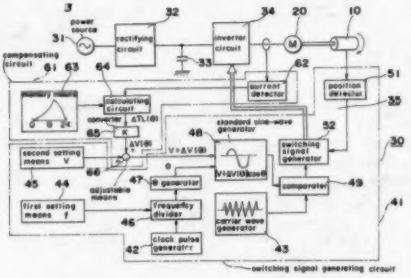
memory means for storing information on radius of curvature of said curve, and

speed control means responsive to said one speed detecting means, said mass detecting means, and said memory means for determining a maximum desired speed as a function of the mass of the carriage and the radius of the curve for limiting the centrifugal force exerted on the carriage when it moves along the curve to a predetermined maximum value, said speed control means including means for controlling said preselected driving means to change the speed of the carriage to the maximum desired speed before the carriage enters the curve.

4,716,347
OSCILLATION REDUCING APPARATUS FOR ROTARY COMPRESSOR

Satoru Fujimoto, Sakai, Japan, assignor to Daikin Industries, Ltd., Osaka, Japan

Filed Mar. 14, 1986, Ser. No. 839,735
Claims priority, application Japan, Mar. 15, 1985, 60-52947
Int. Cl.[4] G05B 5/01
U.S. Cl. 318—460 9 Claims



1. A vibration reducing device for a rotary compressor to be driven by a motor, comprising:

an inverter for actuating the motor upon receiving an electric power from a power source;

means for synchronizing the actuation of the inverter with the rotation of the compressor;

means for detecting the driving condition of the motor;

means for controlling the output of the inverter in response to the output of the means for detecting; and

means for adjusting the output of the means for controlling on the basis of a factor relating to a load torque of the compressor, thereby controlling the generating torque of the motor in accordance with the load torque fluctuation of the compressor.

4,716,348
DC MOTOR ADAPTIVE CONTROLLER

Dennis C. Nolan, West Allis, and David A. Bluma, Milwaukee, both of Wis., assignors to MagneTek, Inc., Los Angeles, Calif.

Filed Aug. 26, 1986, Ser. No. 900,451
Int. Cl.[4] H02P 5/06, 7/14
U.S. Cl. 318—479 17 Claims

1. In a method of regulating DC motors of the type providing armature current through phase control of power semiconductors, the improvement comprising the steps of:

(a) repetitively sensing and storing the highest value of armature current while in discontinuous conduction as a transition value between discontinuous and continuous armature current conduction; and

(b) regulating said armature current to a presently commanded value by operating at a first gain while said armature current is below said transition value, and at a second gain while said armature current is above said transition value.

12. A method of operating a DC motor phase-control regulator comprising:

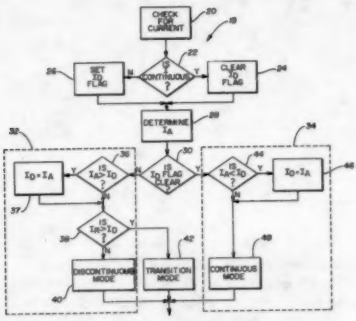
(a) determining whether motor armature current is continuous from phase to phase by sampling said armature cur-

rent a predetermined number of degrees ahead of the firing command in each phase;

(b) computing an average value of said armature current;

(c) comparing said average value of armature current to a stored value representative of the highest previously sensed discontinuous armature current;

(d) retaining the higher of said average value of armature current and said stored value of the highest previously sensed discontinuous armature current when said armature current is discontinuous and retaining the lower of said average value and said stored value of the highest previously sensed discontinuous armature current when said armature current is continuous;



(e) comparing said retained value from step (d) to a current reference signal when said current is discontinuous;

(f) operating said regulator at:

(i) a first gain characteristic when said armature current is discontinuous and said current reference signal is less than said retained value from step (d),

(ii) a second gain characteristic when said armature current is continuous, and

(iii) a third gain characteristic when said armature current is discontinuous and said current reference is greater than said retained value from step (d).

4,716,349

NUMERICAL CONTROL APPARATUS

Morio Koyokawa, and Akihiko Fujimoto, both of Aichi, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

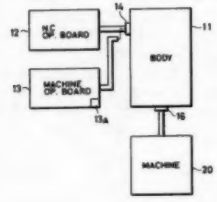
Filed Aug. 31, 1984, Ser. No. 645,959

Claims priority, application Japan, Sep. 1, 1983, 58-160665

Int. Cl.⁴ G05B *11/32*

U.S. Cl. 318—562 **8 Claims**

FIG. 2



1. An NC apparatus comprising;

a body producing a signal for controlling a machine which is an object to be controlled;

an NC operation board removably connected with a serial data interface of said body for inputting a controlling program, in which a high level language is used as a control language, to said body;

a machine operation board removably connected with said interface for controlling said machine;

run code generating means, provided on said machine operation board, for generating a run code signal in parallel form, said run code signal putting the controlling program inputted to said body into a run state; and

a parallel to serial conversion means, provided on said machine operation board, for converting said run code to serial form whereby said run code can be entered into said body through said interface.

4,716,350

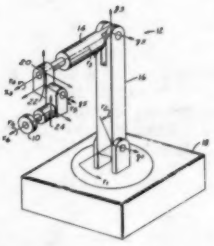
METHOD TO AVOID SINGULARITY IN A ROBOT MECHANISM

Bernard Huang, Ann Arbor, and Veljko Milenkovic, Birmingham, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Dec. 8, 1986, Ser. No. 939,377

Int. Cl.⁴ G05B *19/10*

U.S. Cl. 318—568 **6 Claims**



1. A method to avoid a singularity in a path defined by consecutive points to be followed by a robot end-effector supported by a wrist mechanism that includes first, second and third rotatable joints comprising:

determining allowable rotational speeds of the first and third joints;

maintaining constant the amount of rotation about the second joint corresponding to the points in the region of the singularity;

reducing the amount of rotation of the first and third joints corresponding to the points in the region of the singularity so that the rotational speeds of said joints are no greater than the allowable rotational speeds of said joints as the end-effector follows the path; and

maintaining the end-effector on the path by rotating the position of end-effector without altering the reduced amount of rotation of the joints of the wrist mechanism at the points in the region of the singularity.

4,716,351

MOTOR MONITOR SYNCHRONIZATION SYSTEM

John Bicknell, Rudgwick, England, assignor to Bonar Bray Limited, Hertfordshire, England

Filed Nov. 5, 1985, Ser. No. 795,474

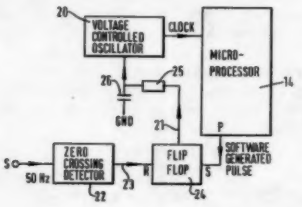
Claims priority, application United Kingdom, Nov. 8, 1984, 8428198

Int. Cl.⁴ G05B *19/29*

U.S. Cl. 318—600 **9 Claims**

1. A magnetic field motor monitor comprising an analogue-to-digital converter arranged to provide digital representations of instantaneous values of a motor magnetic field, a digital processor arranged to receive the digital representations for analysis, a source of clock pulses for the processor, and means for synchronising said clock pulse source to a periodic external signal, said processor comprising means for generating a tim-

ing signal after a fixed number of clock pulses, said synchronising means comprising means for detecting a fixed phase of said periodic external signal and means for controlling the frequency of said clock source in dependence on the time difference between the occurrence of said timing signal and detection of said fixed phase of said periodic external signal.

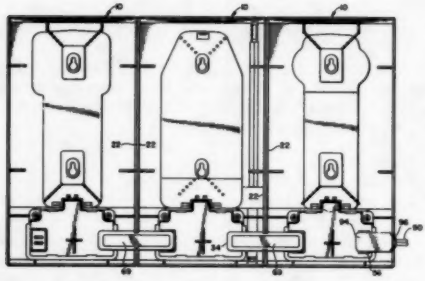


4,716,352

CHARGING BASE FOR A BATTERY-POWERED APPLIANCE

Richard L. Hurn, Ridgely, and Michael R. Sell, Denton, both of Md., assignors to Black & Decker, Inc., Newark, Del.

Filed Dec. 26, 1984, Ser. No. 686,590
Int. Cl.[4] H01M 45/04
U.S. Cl. 320—2 **7 Claims**



1. An electrical charging base for a battery-powered appliance having an electrical charging contact, said base comprising:

(a) a frame defining a shaped cavity for receiving said appliance in only one orientation;

(b) a rectifying circuit disposed in said frame for converting source alternating current to charging direct current, said source alternating current originating from a source outside of said charging base, said rectifying circuit including a source input contact and a charging output contact, said charging output contact being disposed for electrical connection with said charging contact when said appliance is disposed in said cavity;

(c) a source output contact disposed in said frame;

(d) a bypass circuit disposed in said frame for electrically connecting said source input contact to said source output contact, said bypass circuit transmitting source unaltered AC current from said source input contact to said source output contact; and

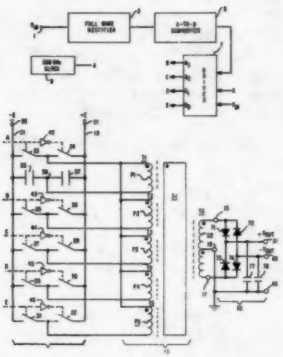
(e) jumper means for electrically connecting said source output contact to a source input contact of a second charging base for another appliance.

4,716,353

BATTERY CHARGER

Rudolph H. Engelmann, Ann Arbor, Mich., assignor to Electro-Voice Inc., Buchanan, Mich.

Filed Sep. 2, 1986, Ser. No. 903,254
Int. Cl.[4] H02J 7/00; G05F 5/00
U.S. Cl. 320—21 **14 Claims**



1. In a battery charging system including a source of DC voltage, transformer means having a primary winding, a plurality of first secondary windings, a plurality of second secondary windings, a current sensing secondary winding, and a plurality of tertiary windings associated with individual ones of said first plurality of secondary windings, respectively, and positive and negative voltage output terminals, the method comprising the steps of:

alternately and successively applying said DC voltage across said primary winding, first in one polarity, and next in opposite polarity, thereby causing oppositely directed pulses of current to flow through said primary winding over successive half-cycles of operation, respectively;

rectifying the AC pulses induced through said first secondary windings;

connecting the rectified AC pulses to said positive and negative current output terminals, for delivering charging current to a battery connected to said output terminals; and

shorting selected ones of said tertiary windings over each half-cycle of operation, for preventing the inducement of voltage across and flow of current from the ones of said first secondary windings associated with shorted ones of said first tertiary windings, respectively, for controlling the magnitude of charging current to be delivered to a battery.

4,716,354

AUTOMATIC VOLTAGE REGULATOR MEANS PROVIDING A DUAL LOW POWER RESPONSIVE AND OUTPUT-VOLTAGE-CONTROLLING REGULATOR SIGNAL PARTICULARLY FOR A PLURAL SOURCE BATTERY POWERED SYSTEM

David C. Hacker, Cedar Rapids, Iowa, assignor to Norand Corporation, Cedar Rapids, Iowa

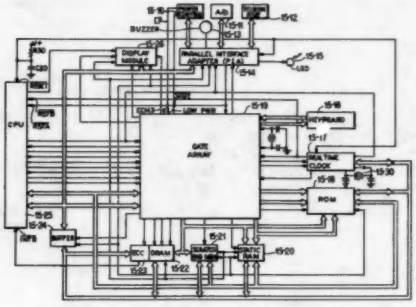
Filed Nov. 12, 1985, Ser. No. 797,235
Int. Cl.[4] H02J 7/04
U.S. Cl. 320—39 **44 Claims**

1. In a system including power supply means for supplying a regulator input voltage,

automatic voltage regulator means having power input means coupled with said power supply means for receiving the regulator input voltage, having power output means for supplying a regulator output voltage, and being automatically operable to maintain a selected value of said regulator output voltage at said power output means for a normal range of values of said regulator input voltage,

said automatic voltage regulator means comprising operational amplifier means providing a regulator signal controlling regulator output voltage so as to maintain the selected value of said regulator output voltage for the normal range of values of said regulator input voltage,

said operational amplifier means causing said regulator signal to progressively change in amplitude to maintain said regulator output voltage at the selected value as the value



of said regulator input voltage is progressively decreased within said normal range, and causing said regulator signal to reach a distinctive limit range as the regulator input voltage falls below a given minimum value, and

signalling means coupled with said operational amplifier means and responsive to said regulator signal for supplying a low power signal to an external circuit when the regulator signal reaches said distinctive limit range.

4,716,355
DEVICE FOR CONTROLLING A CHARGING GENERATOR

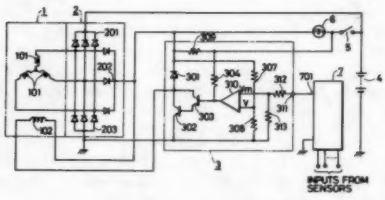
Mitsuharu Morishita, and Shinichi Kouge, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 472,465, Mar. 7, 1983, abandoned. This application Apr. 24, 1986, Ser. No. 856,538

Claims priority, application Japan, Mar. 9, 1982, 57-38915; Mar. 9, 1982, 57-38916

Int. Cl.[4] H02J 7/14

U.S. Cl. 320—64 **6 Claims**



1. An apparatus for controlling a charging generator on a vehicle, said generator having armature coils and a field coil for charging a storage battery, comprising:

(a) a rectifier for rectifying an a.c. output induced in the armature coils into a d.c. output for charging the storage battery;

(b) a voltage regulator for turning a current flowing through the field coils of the charging generator on and off to control and output voltage of the charging generator so as to be maintained at a reference voltage, said voltage regulator comprising a transistor for controlling the conduction of the field coil of the charging generator, and a comparator comparing the output of the rectifier with the reference voltage to produce an output for turning said transistor on and off; and

(c) reference voltage output means for setting a desired reference voltage for said voltage regulator; sensor means responsive to engine speed of said vehicle and charging of said storage battery and providing inputs to reference voltage output means for setting said reference voltage for said voltage regulator, and said voltage regulator including means for providing a plurality of modes of control are determined by whether said set reference voltage as a function of said inputs is inside or outside a preset voltage range.

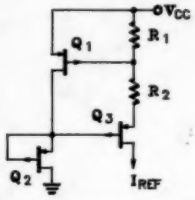
4,716,356
JFET PINCH OFF VOLTAGE PROPORTIONAL REFERENCE CURRENT GENERATING CIRCUIT

Robert L. Vyne, Tempe, and David M. Susak, Mesa, both of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 19, 1986, Ser. No. 943,341

Int. Cl.[4] G05F 3/08

U.S. Cl. 323—312 **4 Claims**



1. A circuit for generating a reference current proportional over temperature to the ratio of the pinch off voltage V_p of a JFET to some resistance, comprising:

a first JFET having a source coupled to a first source of supply voltage, a gate, and a drain;

first means coupled to the drain of said first JFET for imparting a negative gate-to-source voltage on said first JFET;

first resistive means coupled between the gate and source of said first JFET for producing said reference current; and

second means coupled to the gate and drain of said first JFET for setting the voltage at the drain of said first JFET.

4,716,357
AC VOLTAGE REGULATOR WITH SPLIT PRIMARY SWITCHING

Edward Cooper, 2612 Penrose St., San Diego, Calif. 92101

Continuation-in-part of Ser. No. 805,829, Dec. 6, 1985. This application Oct. 23, 1986, Ser. No. 922,196

Int. Cl.[4] G05F 1/30

U.S. Cl. 323—263 **21 Claims**

1. An apparatus for regulating an AC line voltage, comprising:

an input port for connection to a source of input AC voltage;

an output port for delivering a regulated voltage to a load;

transformer means for regulating the output voltage, comprising a buck/boost winding connected between the input and output port, a primary winding split into two oppositely wound portions each having a greater number of turns than the buck/boost winding, each primary winding portion being split into at least two winding parts and a common transformer core about which both windings are wound;

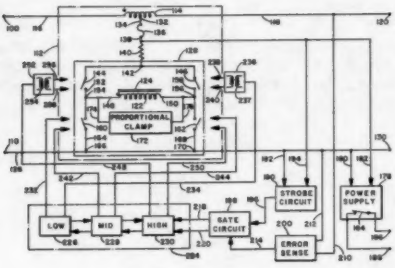
switch means for controlling the connection of the primary winding in circuit with the buck/boost winding, including means for selectively connecting the primary winding in different configurations in the circuit the switch means comprising first switch means for controlling connection of the two parts of one of the primary winding portions in series in the circuit in a first, boost configuration, and second switch means for controlling connection of the two parts of the other winding portion in series in the circuit in a second, buck configuration;

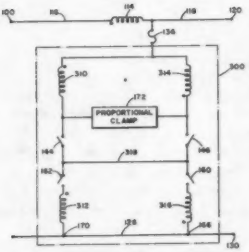
voltage sensing means for detecting the magnitude of the line voltage and for producing corresponding control

signals when the line voltage varies outside predetermined limits; and

switch controlling means responsive to the voltage sensing means control signals for closing said first switch means if the voltage is below the predetermined limits and closing said second switch means if the voltage is aboe the predetermined limits, the transformer means comprising a step up transformer in the first configuration and a step down transformer in the second configuration; and

energy proportional current and voltage limiting means for limiting the current and voltage across the primary winding.



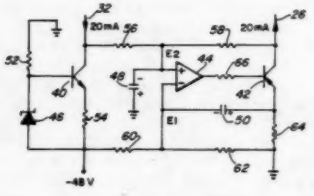


4,716,358

CONSTANT CURRENT CIRCUITS

Dermot T. Fucito, Norcross, Ga., assignor to Northern Telecom Limited, Montreal, Canada

Filed Nov. 12, 1986, Ser. No. 929,715
Int. Cl.[4] G05F *3/28*
U.S. Cl. 323—316 **10 Claims**



1. A constant current circuit comprising:

first means for passing a constant current, said first means having first and second terminals;

second means for passing a current, the second means having first and second terminals and including control means for controlling the current passed by the second means;

a first potential divider connected between the first terminals of the first and second means and having a tapping point;

a second potential divider connected between the second terminals of the first and second means and having a tapping point; and

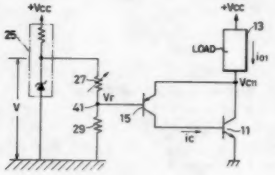
amplifier means responsive to potential difference between the tapping points of the first and second potential dividers for controlling the control means, whereby the current passed by the second means has a predetermined relationship to the constant current passed by the first means.

4,716,359

OUTPUT STAGE CONTROL CIRCUIT

Hidetaka Numata, and Toshihiko Kawata, both of Furukawa, Japan, assignors to Alps Electric Co., Ltd., Japan

Filed Nov. 13, 1986, Ser. No. 930,794
Claims priority, application Japan, Nov. 15, 1985, 60-257475
Int. Cl.[4] G05F *1/445*
U.S. Cl. 323—349 **3 Claims**



1. An output stage control circuit for stably controlling a current through a varying load having one terminal connected to a power supply source, comprising:

output driving means constituted by an output stage transistor having its collector and emitter terminals connected in series between the other terminal of said load and ground for adjusting the current through said load;

control means constituted by a control transistor having its collector and emitter terminals connected between said other terminal of said load and a base terminal of said output stage transistor for supplying an analog control signal to said base terminal of said output stage transistor; and

a reference voltage supply source for providing a reference voltage signal to a base terminal of said control transistor,

whereby the current through the load is stably controlled by said output driving means in response to the analog control signal provided by said control means which is determined in response to the reference voltage signal.

4,716,360

MOISTURE DETECTOR APPARATUS AND METHOD

Ivars E. Pakulis, Arlington Heights, Ill., assignor to Advanced Moisture Technology, Inc., Wauconda, Ill.

Filed Aug. 16, 1985, Ser. No. 766,426
The portion of the term of this patent subsequent to Nov. 27, 2001, has been disclaimed.
Int. Cl.[4] G01R *27/26*
U.S. Cl. 324—58.5 A **28 Claims**

1. An apparatus for analyzing a sample of moisture containing material comprising:

first means for forming a chamber effectively preventing reflection of microwave energy;

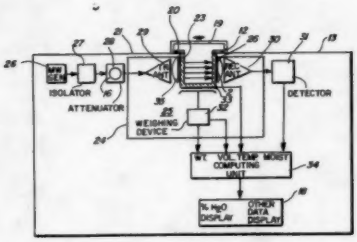
second means defining a sample cell space for retaining a moisture containing sample material, said second means being arranged to be disposed in said chamber;

third means for transmitting microwave energy in the form of a parallel beam, planar wavefront through said second means in said chamber;

fourth means for receiving radiation transmitted through

said space and providing a first output signal representative of water weight in a sample material therein;

fifth means coupled to said first and second means for providing a second output signal representing the weight of a sample material including the water weight retained in said space;



sixth means for receiving said first and second output signals and providing a third output signal representing the percent by weight moisture content of material retained in said space; and

seventh means for measuring the temperature of the sample material retained in said space during a weight sensing operation and providing a fourth output signal.

4,716,361

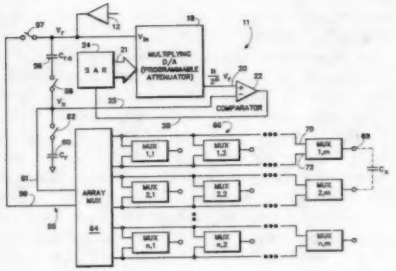
CAPACITANCE MEASURING METHOD AND APPARATUS

Tzafrir Sheffer, Seattle, Wash., assignor to John Fluke Mfg. Co., Inc., Everett, Wash.

Continuation-in-part of Ser. No. 668,622, Nov. 5, 1984, abandoned. This application Jun. 11, 1985, Ser. No. 743,622

Int. Cl.[4] G01R *27/00*

U.S. Cl. 324—60 R **10 Claims**



1. A method for measuring the magnitude of an unknown capacitance utilizing a ratiometric capacitance measurement apparatus adapted to measure the magnitude of a capacitor relative to a known capacitance coupled to said capacitor, the method comprising the steps of:

coupling said apparatus to said unknown capacitance; and

utilizing said apparatus to measure the magnitude of said unknown capacitance relative to said known capacitance wherein said known capacitance is the inherent capacitance coupling said capacitance mesurement device to a point of common reference potential.

4,716,362

SURFACE WAVE DISPERSIVE FILTER SPECTRUM ANALYZER

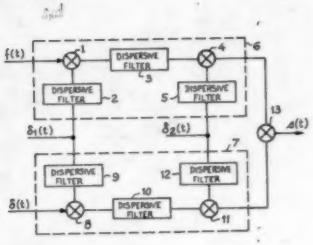
René Ambos, Morangis; Gilles Quagliaro, Chatillon, and Alain Fertil, Voisin le Bretonneux, all of France, assignors to Thomson CSF, Paris, France

Filed Oct. 21, 1985, Ser. No. 789,952

Claims priority, application France, Oct. 30, 1984, 84 16600

Int. Cl.[4] G01R *23/16*

U.S. Cl. 324—77 B **4 Claims**



1. A surface wave dispersive filter spectrum analyzer, comprising:

a first M-C-M analyzer including:

first dispersive filter means for receiving a first driving signal, and for delivering a first linearly frequency modulated ramp signal;

first mixer means for receiving an input signal f (t), and for premultiplying said signal f(t) by said first ramp signal to provide a first multiplied signal;

second dispersive filter means for convoluting said first multiplied signal with a second linearly frequency modulated ramp signal to provide a first convoluted signal;

third dispersive filter means for receiving a second driving signal, and for delivering a second linearly frequency modulated ramp signal; and second mixer means for postmultiplying said first convoluted signal by said second ramp signal to provide a first analyzed signal;

a second M-C-M analyzer including:

fourth dispersive filter means for receiving said first driving signal, and for delivering a fourth linearly frequency modulated ramp signal;

third mixer means for receiving a reference signal, and for premultiplying said reference signal by said fourth ramp signal to provide a second multiplied signal;

fifth dispersive filter means for convoluting said second multiplied signal with a fifth linearly frequency modulated ramp signal to provide a second convoluted signal;

sixth dispersive filter means for receiving said second driving signal, and for providing a sixth linearly frequency modulated ramp signal; and

fourth mixer means for postmultiplying said second convoluted signal by said sixth ramp signal to provide a second analyzed signal; and fifth mixer means for mixing said first and second analyzed signals to provide an output signal.

4,716,363

EXPONENTIAL DECAY TIME CONSTANT MEASUREMENT USING FREQUENCY OF OFFSET PHASE-LOCKED LOOP: SYSTEM AND METHOD

John N. Dukes, Los Altos Hills; William F. Carlsen, Jr., Mountain View, and Richard J. Pittaro, San Carlos, all of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed May 8, 1987, Ser. No. 47,818

Int. Cl.[4] G01R *23/16*

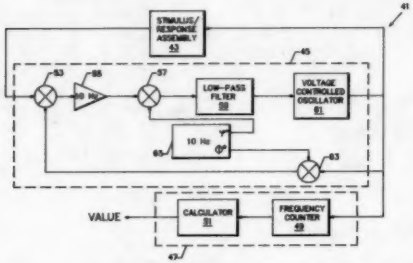
U.S. Cl. 324—77 R **18 Claims**

1. A system for measuring a value functionally related to an exponential decay time constant, said system comprising:

stimulus/response means including stimulus means for stim-

ulating a sample in response to a received stimulus signal and response means for providing a response signal reflecting a response generated by said sample;

an offset-phase locked loop including a signal generator, said generator being adapted for generating a periodic stimulus signal characterized by a frequency within a predetermined generator frequency range, said offset-phase locked loop being arranged in a feedback relation with said stimulus/response means so that said periodic stimulus signal is



received by said stimulus means so as to yield a periodic response signal which is fed back to said offset-phase locked loop via said response means, said offset-phase locked loop being adapted for forcing an offset-phase angle between said periodic stimulus signal and said periodic response signal, said offset-phase angle being constant over said generator frequency range; and

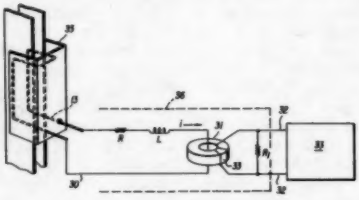
conversion means for deriving from the frequency of said stimulus signal a value related to an exponential time constant for said response signal.

4,716,364

MONITORING TRANSIENTS IN LOW INDUCTANCE CIRCUITS

Richard P. Guilford, and John R. Rosborough, both of Albuquerque, N. Mex., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Oct. 21, 1985, Ser. No. 789,892
Int. Cl.[4] G01R *1/20, 19/00;* **H01F** *27/28*
U.S. Cl. 324—127 **10 Claims**



1. Apparatus for monitoring an opposed pair of flat cable transmission lines for transient current spikes, wherein the lines generate a field of magnetic flux therearound, said apparatus comprising:

an elongated coil having a pair of output terminals, said coil being configured as a U-shaped article having a bight portion connecting a spaced pair of opposed legs, said coil being divided along said bight portion and having an equal portion on each leg, each portion including an elongated section for inducing a current signal in response to the magnetic flux from one of said cable pair, said current signals adding to create an output signal, wherein the pair of flat cable transmission lines are received between said legs of said U-shaped article;

lead means connected to said output terminals of said coil and forming a loop;

a current transformer coupled to said loop for generating an isolated ground signal proportional to the current in the pair of flat cable transmission lines; and

means connected to said current transformer for detecting transient spikes in the isolated ground signal.

4,716,365

CIRCUIT TESTER

James L. Pool, Clarinda, Iowa, assignor to Lisle Corporation, Clarinda, Iowa

Filed Oct. 11, 1985, Ser. No. 786,747
Int. Cl.[4] G01R *31/02*
U.S. Cl. 324—158 P **5 Claims**

1. A circuit tester comprising, in combination:

a housing having a closed end, an open end, and a transparent portion, said housing defining a central chamber;

a bulb adapted to fit within said central chamber and extending into said transparent portion, said bulb including a first and second contact;

ground means, extending through said housing, for interconnecting with and grounding said first contact of said bulb;

a removable cap member adapted to engage and close said open end of said housing in an assembled state;

an electrode fixedly secured to said removable cap member, said electrode extending through the cap member and including a head portion within said removable cap member and a needle portion defining a pointed end and extending outside the cap member for contacting a wire;

spring contact means interconnecting said head portion of said electrode and said second contact of said bulb in said assembled state;

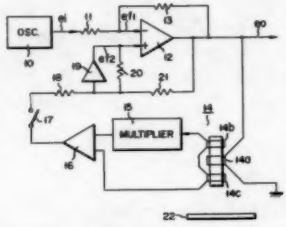
a catch member slidably mounted on said electrode, said catch member including a hook portion and a grasping portion opposite said hook portion; and

means for simultaneously maintaining said catch member on said electrode and for positionally biasing said catch member towards an at-rest position, said hook portion of said catch member extending beyond said pointed end of said electrode in said at-rest position and translatable against a biasing force to engage a wire against the pointed end, said means for maintaining comprising a single spring member connected at its opposite ends to the cap member and the grasping portion of the catch member.

4,716,366
EDDY CURRENT DISTANCE SIGNAL APPARATUS WITH TEMPERATURE CHANGE COMPENSATION MEANS

Toshiaki Hosoe, Yokosuka; Seigo Ando, Yokohama, and Yoshihiro Kawase, Kawasaki, all of Japan, assignors to Nippon Kokan K.K., Tokyo, Japan

Filed Jun. 27, 1985, Ser. No. 749,941
Claims priority, application Japan, Jun. 30, 1984, 59-136311
Int. Cl.[4] G01B *7/14*; G01F *23/00*; G01R *33/12*
U.S. Cl. 324—207 **9 Claims**



1. An eddy current distance signal apparatus for measuring a distance between a sensor of the apparatus and a conductive object, comprising:

an eddy current sensor having a primary coil for generating an AC magnetic field, and two secondary coils each arranged to have the same distance from the primary coil so that the secondary coils generate the same inductance voltages in response to said AC magnetic field, when the sensor is not located near an object to be measured;

means for supplying an alternating current signal to said primary coil;

voltage regulating means coupled to an output terminal of one of said two secondary coils, for adjusting a voltage induced at said one of said two secondary coils to be equal to that induced at the other secondary coil when said sensor is separated from the object to avoid inducement of eddy currents in the object that would otherwise vary the inductance voltage generated by one of said secondary coils; and

means for calculating a difference voltage corresponding to said distance signal, between an output voltage from said voltage regulating means and an output voltage at said other secondary coil when said sensor is located at a distance to be measured relative to the object whereat the output voltage of one of said secondary coils is varied accordingly to an eddy current magnetic field generated by the object in response to said AC magnetic field;

wherein said alternating current signal supplying means comprises:

means for generating the alternating current signal having predetermined amplitude and frequency, and

feedback amplifier means for adding the alternating current signal and the difference voltage and supplying a sum signal to said primary coil, whereby an output signal indicative of the distance being measured is obtained at an output of said feedback amplifier means.

4,716,367
CREATION AND USE OF A MOVING REFERENCE FRAME FOR NMR IMAGING OF FLOW

H. Samuel Patz, Wayland, Mass., assignor to Brigham & Women's Hospital, Boston, Mass.

Filed Aug. 15, 1986, Ser. No. 896,814
Int. Cl.[4] G01R *33/20*
U.S. Cl. 324—309 **33 Claims**

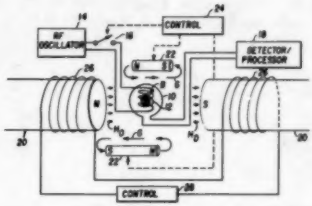
1. A method for measuring movement of nuclei in a sample using a nuclear magnetic resonance technique, comprising the steps of:

exciting a nuclear magnetic resonance signal;

measuring said nuclear magnetic resonance signal emitted by said nuclei; and

determining the nuclei moving in a given range of velocities;

wherein a moving reference frame adjustment parameter is effectively varied over time to provide a moving reference frame to which the motion of said nuclei is effectively compared in said measuring and determining steps so as to cause nuclei moving with the reference frame to have an NMR response substantially the same as the nuclei would have if both the reference frame and the nuclei were stationary; and

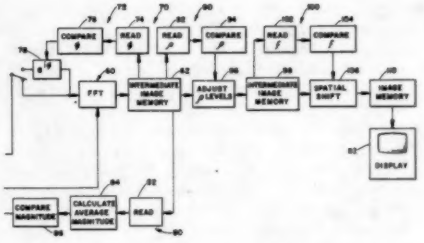


wherein resolution of velocity is independent of the thickness, in the direction of motion of the reference frame, of a volume in which nuclei are excited and from which the NMR response is sampled.

4,716,368
MAGNETIC RESONANCE RECONSTRUCTION AND SCANNING TECHNIQUES USING KNOWN INFORMATION, CONSTRAINTS, AND SYMMETRY RELATIONS

E. Mark Haacke, University Heights, Ohio, assignor to Picker International, Inc., Highland Hts., Ohio

Continuation-in-part of Ser. No. 764,439, Aug. 9, 1985, which is a continuation-in-part of Ser. No. 731,509, May 7, 1985, Pat. No. 4,678,996. This application Sep. 30, 1985, Ser. No. 782,075
Int. Cl.[4] G01R *33/20*
U.S. Cl. 324—309 **8 Claims**



1. A method of magnetic resonance imaging with reduced phase error distortion, the method comprising:

(a) positioning a subject and a reference in an image region;

(b) exciting magnetic resonance of magnetic dipoles of at least a portion of the subject and reference which the disposed in the image region;

(c) causing a phase encode magnetic field gradient in the image region which phase encodes a magnetic resonance signal emanating from the resonating magnetic dipoles of the subject and the reference;

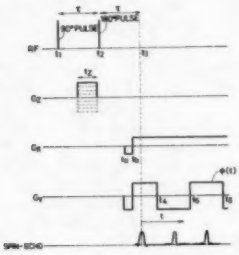
(d) receiving the phase encoded resonance signal from the resonating magnetic dipoles in the image region;

(e) rotating the received resonance signal by a phase offset;
(f) transforming the phase offset rotated received signal;
(g) determining a phase angle corresponding to the reference from the transformed signal;
(h) comparing the determined phase angle with a selected phase angle;
(i) adjusting the phase offset in accordance with the determined and selected phase angle comparisons and repeating steps (e) and (f);
(j) repeating steps (b) through (i) with each of a plurality of different phase encode gradients and creating an image representation from the transformed signals.

4,716,369
HIGH SPEED IMAGING METHOD WITH THREE-DIMENSIONAL NMR

Kensuke Sekihara, Hachioji; Shigeru Matsui, Koganei; Hideki Kohno, Suginami; Etsuji Yamamoto, and Hidemi Shiono, both of Akikawa, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jun. 20, 1985, Ser. No. 746,663
Claims priority, application Japan, Jun. 20, 1984, 59-126843; Jul. 6, 1984, 59-139001
Int. Cl.[4] G01R *33/20*
U.S. Cl. 324—309 **9 Claims**

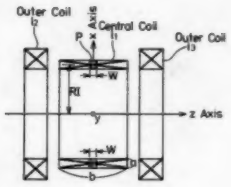


1. A high speed imaging method using three-dimensional NMR comprising the steps of:
(a) exciting nuclear spins of an object placed under a homogeneous static magnetic field;
(b) applying a 180° radio frequency pulse to said object a predetermined time after said excitation;
(c) applying a first gradient magnetic field with a predetermined amplitude for providing said static magnetic field with a spatial gradient along a first direction within a certain time during the period from said excitation until the generation of an echo signal by the application of said 180° radio frequency pulse;
(d) applying second and third gradient magnetic fields for providing said static magnetic field with respective spatial gradients along a second and a third direction perpendicular to said first direction, wherein one of said second and third gradient magnetic fields is constant and the other is periodically inverted so as to form an echo train of;
(e) repeating said steps (a)–(d) a plurality of times to obtain a measured signal by each repetition, the amplitude of said first gradient magnetic field being sequentially varied in each repetition; and
(f) Fourier-converting the measured signal obtained by each said repetition so as to obtain a three-dimensional distribution of nuclear spins in said object.

4,716,370
COIL ARRANGEMENT FOR PRODUCING STATIC MAGNETIC FIELD

Yuji Inoue; Hideto Iwaoka, and Tadashi Sugiyama, all of Tokyo, Japan, assignors to Yokogawa Electric Corporation and Yokogawa Medical Systems, Limited, both of Tokyo, Japan

Filed Sep. 20, 1985, Ser. No. 778,368
Claims priority, application Japan, Sep. 27, 1984, 59-202450
Int. Cl.[4] G01R *33/20*
U.S. Cl. 324—319 **2 Claims**

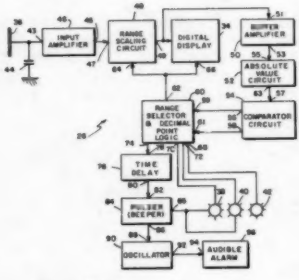


2. A coil arrangement for use in an NMR tomograph for producing a static magnetic field, said coil arrangement consisting of a central coil and two outer coils disposed on opposite sides of said central coil; wherein said central coil has a rectangular cross section comprising a first dimension (a) in the X-axis direction, a second dimension (b) in the Z-axis direction, and a center portion (P) having a length dimension (W) in the Z-axis direction; wherein said length dimension (W) is substantially smaller than the second dimension (b), and other portions of said central coil equals said second dimension (b) less said length dimension (W); wherein said center portion (P) has a greater number of windings per unit dimension in the X-axis direction and in the Z-axis direction than for the other portions of said central coil; wherein said center portion (P) has a current density of about twice the current density of said other portions of said central coil; and wherein further are provided means for applying current to said center portion (P) of said central coil greater than current applied to said other portions of said central coil.

4,716,371
NON-CONTACT AUTORANGING ELECTROSTATIC FIELDMETER WITH AUTOMATIC DISTANCE INDICATOR

Mark Blitshteyn, Edison, N.J., and William S. Wright, Green Lane, Pa., assignors to The Simco Company, Inc., Hatfield, Pa.

Filed Jul. 22, 1985, Ser. No. 757,652
Int. Cl.[4] G01R *29/12*
U.S. Cl. 324—457 **5 Claims**



1. An apparatus for measuring electrostatic fields and related parameters such as electrostatic potential, voltage and charge

density of objects in a non-contact manner, the apparatus comprising a sensor for sensing the electrostatic field produced by a charged object and for producing an electrical signal in response thereto, display means responsive to the electrical signal for providing a visual indication of the charge on the object, means for coupling the display means to the sensor, the display means having a first range for use in measurement by the sensor at a first distance from the object and a second range for use in measurement by the sensor at a second distance from the object, the means for coupling the display means to the sensor including means for scaling the electrical signal, first indicating means for providing an indication that the sensor is to be placed at the first distance from the charged object, second indicating means for providing an indication that the sensor is to be placed at the second distance from the charged object, a comparator, logic, means for coupling the comparator to the sensor, means for coupling the logic to the comparator, and means for coupling the means for scaling the electrical signal, the first indicating means and the second indicating means to the logic.

4,716,372

CIRCUIT ARRANGEMENT FOR MONITORING THE CURRENT SUPPLY OF AN ELECTRIC CONSUMER

Edwin Fauser, Ditzingen, and Hans List, Pforzheim, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

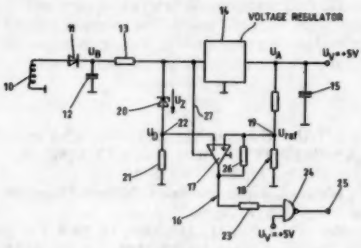
PCT No. PCT/DE85/00430, § 371 Date Aug. 18, 1986, § 102(e) Date Aug. 18, 1986, PCT Pub. No. WO86/03860, PCT Pub. Date Jul. 3, 1986

PCT Filed Oct. 30, 1985, Ser. No. 908,812

Claims priority, application Fed. Rep. of Germany, Dec. 18, 1984, 3446129

Int. Cl.⁴ H03K *5/24*; G01R *19/165*

U.S. Cl. 328—146 **8 Claims**



1. A circuit arrangement for monitoring the current supply of an electric consumer such as a microcomputer on a mobile data carrier wherein energy is transferred inductively, the circuit arrangement comprising:

inductive means for receiving the energy transferred inductively to provide an operating voltage which changes with time to rise above a predetermined minimum value and to then fall below this minimum value;

voltage regulator means receiving said operating voltage and generating a regulator output voltage which defines an approximately constant supply voltage so long as said operating voltage is above said minimum value; and,

voltage monitor means for providing a switch-on signal switching the consumer on and a switch-off signal for switching off the consumer after said regulator output voltage rises to said supply voltage and before said regulator output falls below said supply voltage, said voltage monitor means including:

reference voltage circuit means for supplying a reference voltage proportional to said regulator output voltage;

difference voltage circuit means for supplying a difference voltage exceeding a predetermined threshold value, said threshold value being selected so that said difference voltage first exceeds and then drops beneath said reference voltage when said regulator output voltage has reached and not yet dropped below said supply voltage;

a comparator having a first input for receiving said reference voltage and a second input for receiving said difference voltage, said comparator further having an output for providing said switch-on signal and said switch-off signal.

4,716,373

METHOD AND CIRCUIT ARRANGEMENT FOR INCREASING THE SIGNAL-TO-NOISE RATIO OF A PERIODICAL ELECTRICAL SIGNAL

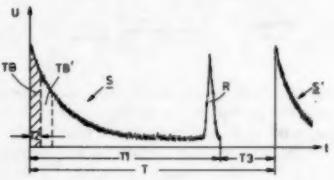
Michael Schulze, Much, Fed. Rep. of Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 29, 1984, Ser. No. 665,836

Claims priority, application Fed. Rep. of Germany, Oct. 28, 1983, 3339146

Int. Cl.⁴ H04B *1/10*

U.S. Cl. 328—165 **18 Claims**



1. A method of increasing the signal-to-noise ratio of a portion of a periodical electrical signal, said method comprising:

integrating the amplitude of said signal during a base time period corresponding to the portion of said periodical signal for which the signal-to-noise ratio is to be increased, so as to provide a first signal representative of an overall processed value;

dividing said time period into a plurality of consecutive signal suppression subperiods and, for each such subperiod, integrating the amplitude of the periodical signal during a signal transmission period which is equal to said base time period less said subperiod, so as to provide a plurality of integrated second signals, each associated with one suppression subperiod;

subtracting each subperiod-associated second signal from said first signal so as to provide a plurality of difference signals, each associated with a signal suppression subperiod; and

arranging said difference signals in the same sequence as their associated suppression subperiods so as to produce an output signal having the same general waveform as the periodical signal and an improved signal-to-noise ratio.

4,716,374

ADAPTIVE ANALOG VARIABLE LIMITER

Peter E. Tilly, Cedar Rapids, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Jun. 13, 1986, Ser. No. 874,244

Int. Cl.⁴ H03K *5/08*

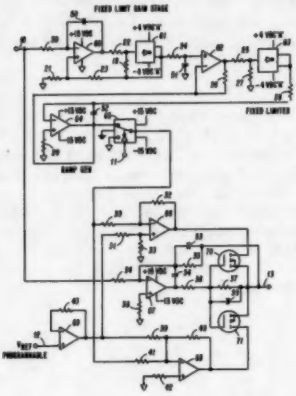
U.S. Cl. 328—169 **3 Claims**

1. An analog variable output limiter for an amplifier, comprising:

means for limiting an output value of said amplifier to a select range of possible values, said range having upper and lower limits; and

means for varying said limits, while maintaining said range substantially constant, and following said output value as a time function slower than potential amplifier output fluctuations, thereby precluding sudden errant outputs

outside said range limits and permitting said range to follow slower varying amplifier outputs,



said means for limiting includes voltage references comparator coupled operational amplifiers, and said means for varying said limits includes a ramp generator coupled to said comparator coupled operational amplifiers.

4,716,375

SWITCHED-CAPACITOR MULTIPLIER CIRCUIT

Arthur H. M. van Roermund, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 26, 1986, Ser. No. 878,940

Claims priority, application Netherlands, Jul. 18, 1985, 8502071

Int. Cl.[4] H03D *3/18;* **H03K** *5/00, 17/00*

U.S. Cl. 329—50 **4 Claims**

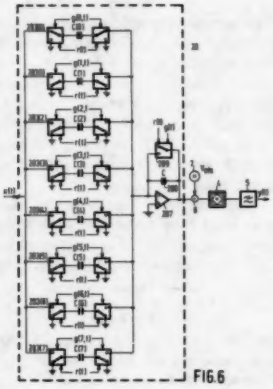


FIG.6

1. A switched-capacitor distributed multiplier circuit for multiplying an information signal x(t) by a multiplier signal constituted by a periodical bipolar carrier signal d(t), comprising:

means for rectifying said bipolar carrier signal, thereby creating a rectified carrier signal;

means for applying said rectified carrier signal to said multiplier circuit to constitute said multiplier signal; and

auxiliary multiplier circuit means connected exclusively to the output of said multiplier circuit for multiplying the output signal of said distributed multiplier circuit by a binary signal having a value indicative of the instantaneous polarity of said bipolar carrier signal.

4,716,376

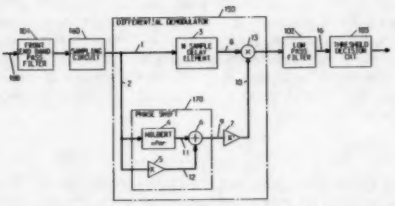
ADAPTIVE FSK DEMODULATOR AND THRESHOLD DETECTOR

Douglas S. Daudelin, Howell, N.J., assignor to AT&T Information Systems Inc., Holmdel, N.J.

Filed Jan. 31, 1985, Ser. No. 697,001

Int. Cl.[4] H03K *9/06*

U.S. Cl. 329—107 **22 Claims**



1. Apparatus for demodulating a frequency shift keyed (FSK) signal having upper and lower frequency components, said apparatus including

first means for providing a delayed version of said FSK signal, each frequency component in said delayed version being phase shifted in an amount which is linearly related to the frequency of said component,

second means for shifting the phase of said FSK signal by a preselected constant value such that a center frequency which is halfway between said upper and lower frequency components is 90 degrees out of phase with the phase of the center frequency of said delayed version, and

third means responsive to said delayed version and the output of said second means for providing an output indicative of the relative phase difference therebetween.

4,716,377

PIEZOELECTRIC RESONANCE COMPONENT HAVING AN IMPROVED GROUP DELAY TIME CHARACTERISTIC

Jiro Inoue, Ishikawa, Japan, assignor to Murata Manufacturing Co., Ltd., Nagaokakyo, Japan

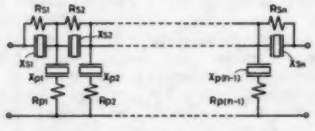
Continuation of Ser. No. 711,210, Mar. 13, 1985, Pat. No. 4,651,109. This application Jul. 22, 1986, Ser. No. 887,925

Claims priority, application Japan, Jun. 12, 1984, 59-121023; Nov. 26, 1984, 59-179179

The portion of the term of this patent subsequent to Mar. 17, 2004, has been disclaimed.

Int. Cl.[4] H03H *9/13*

U.S. Cl. 329—117 **7 Claims**



1. A piezoelectric resonance component having an improved group delay time characteristic comprising:

an input terminal and an output terminal and a common terminal;

a plurality of first circuits connected in series between said input and output terminals, at least one of said first circuits comprising a piezoelectric resonator connected in parallel with a damping resistor;

a plurality of second circuits, at least one of said second circuits comprising a piezoelectric resonator connected in series with a damping resistor;

wherein said plurality of second circuits are each respectively connected between said common terminal and a node formed between two of said plurality of first circuits.

4,716,378

AMPLIFIER CIRCUIT

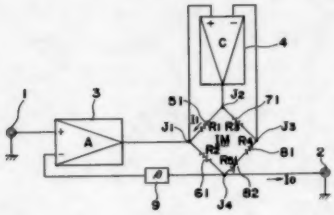
Hideyasu Jiko, Neyagawa, and Tomoyuki Hayashi, Hirakata, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Apr. 14, 1986, Ser. No. 851,527

Claims priority, application Japan, Apr. 15, 1985, 60-79602

Int. Cl.⁴ H03F *1/34*

U.S. Cl. 330—108 **6 Claims**



1. An amplifier circuit comprising:

an input terminal;

a first amplifier having an inverting input and a non-inverting input, said non-inverting input being connected to said input terminal;

a second amplifier having an inverting input and a non-inverting input, said non-inverting input of said second amplifier being connected to an output of said first amplifier;

an impedance circuit defined by first, second, third and fourth impedance elements connected in a bridge circuit,

a first function between said first impedance element and second impedance element being connected to an output of said first amplifier;

a second junction between said first impedance element and said third impedance element being connected to an output of said second amplifier;

a third function between said third impedance element and said fourth impedance element being connected to said inverting input of said second amplifier;

a fourth junction between said second impedance element and said fourth impedance element;

a negative feedback circuit connected between said fourth junction and said inverting input of said first amplifier;

an output terminal connected to said fourth junction; and

a load connected between said output terminal and ground.

4,716,379

DIFFERENTIAL AMPLIFIER INCLUDING BALANCED TWO TERMINAL SERIES RC NETWORK

William F. Davis, Tempe, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Jun. 30, 1986, Ser. No. 880,472

Int. Cl.⁴ H03F *3/45, 3/14*

U.S. Cl. 330—252 **6 Claims**

1. An RC circuit integrable in a semiconductor substrate, comprising:

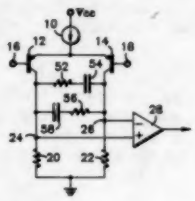
a first resistor diffused in said substrate and having first and second terminals;

a second resistor diffused in said substrate and having first and second terminals;

a first capacitor having a first diffused plate formed in said substrate and connected to the first terminal of said second resistor;

a second capacitor having a first diffused plate formed in said substrate and connected to the second terminal of said first resistor;

said first capacitor having a second plate comprised of a



metal layer insulatingly disposed over the first diffused plate of said first capacitor and connected only to the first terminal of said first resistor; and

said second capacitor having a second plate comprised of a metal layer insulatingly disposed over the first diffused plate of said second capacitor and connected only to the second terminal of said second resistor.

4,716,380

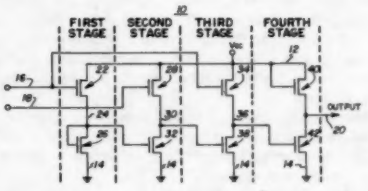
FET DIFFERENTIAL AMPLIFIER

Robert J. Proebsting, Dallas, Tex., assignor to Thomson Components-Mostek Corporation, Carrollton, Tex.

Continuation of Ser. No. 430,226, Sep. 30, 1982, abandoned, which is a continuation of Ser. No. 119,873, Feb. 8, 1980, abandoned. This application Jul. 23, 1984, Ser. No. 633,375

Int. Cl.⁴ H03F *3/45*

U.S. Cl. 330—253 **22 Claims**



8. A field effect transistor differential amplifier which receives input signals through first and second input terminals, produces an output signal at an output terminal, and is powered through first and second power terminals, comprising:

a first stage comprising a first transistor, the gate terminal thereof connected to said first input terminal, the drain terminal thereof connected to said first power terminal and the source terminal thereof connected to a first node, said first stage including a second transistor having the gate and drain terminals thereof connected to said first node and the source terminal thereof connected to said second power terminal, the gain of said second transistor greater than the gain of said first transistor;

a second stage comprising a third transistor, the gate terminal thereof connected to said second input terminal, the drain terminal thereof connected to said first power terminal and the source terminal thereof connected to said output terminal, said second stage including a fourth transistor, the gate terminal thereof connected to said first node, the drain terminal thereof connected to said output terminal and the source terminal thereof connected to said second power terminal, the gain of said fourth transistor greater than the gain of said third transistor; and

said first stage has greater gain than said second stage

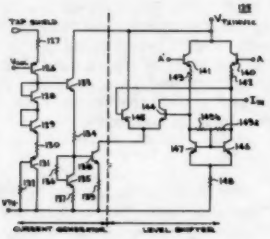
whereby said output signal is driven to a first state when the voltage of the input signal at said first input terminal is greater than the sum of the voltage of the input signal at said second input terminal and a predetermined voltage differential and said output signal is driven to a second state when the voltage of the input signal at said first input terminal is less than the sum of the voltages of the input signal at said second input terminal and said predetermined voltage differential.

4,716,381

HIGH-CURRENT OPERATIONAL AMPLIFIER

David L. Campbell, Sunnyvale, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Apr. 3, 1986, Ser. No. 847,804
Int. Cl.[4] H03F 3/45
U.S. Cl. 330—256 **4 Claims**



1. In an integrated circuit transceiver, including a differential operational amplifier generating signals to be transmitted over a node meeting IEEE 802.3 standards, a circuit which translates a reference voltage from positive ground to negative ground and generates a current-gain (h_{FE})- and and temperature-compensated output current received by said operational amplifier constant within an operating voltage range and proportional to said reference voltage, comprising a current generator circuit and a level-shifter circuit, said current generator circuit comprising:

a first transistor having a base terminal connected to said reference voltage, an emitter terminal coupled through a first resistance element to a tap shield terminal, and a collector terminal; and

compensation means comprising:

a second transistor having an emitter terminal, a collector terminal connected to a first voltage supply, and a base terminal coupled to said first voltage supply through a second resistance element;

a third transistor having a collector terminal, a base terminal coupled to said third transistor collector terminal through a third resistance element, and an emitter terminal coupled to said first voltage supply through a fourth resistance element;

a fourth transistor having a base terminal connected to said third transistor collector terminal, an emitter terminal coupled to said first voltage supply through a fifth resistance element, and a collector terminal;

a series of two diode-connected transistors, a first of said series having its anode terminal connected to said first transistor collector terminal and a second of said series having a cathode coupled to said second transistor emitter terminal through a sixth resistance element; and

a fifth transistor having a base terminal connected to said first transistor collector terminal, an emitter terminal coupled to said third transistor collector through a seventh resistance element, and a collector

whereby an intermediate current is conducted by, and an h_{FE}-compensated base voltage generated at, said fourth transistor collector terminal and a negative-ground translated reference voltage generated at said fifth transistor collector terminal,

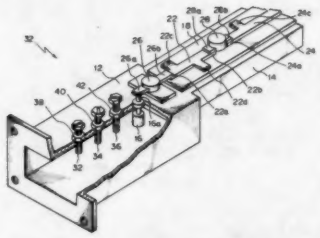
said level-shifter comprising means responsive to differential input signals, said negative-ground translated reference voltage and said h_{FE}-compensated base voltage and intermediate current, for generating said output current.

4,716,382

MICROWAVE AMPLIFYING APPARATUS

Wasuke Yanagisawa, and Kenichi Muramatsu, both of Tokyo, Japan, assignors to Yokowo Mfg. Co., Ltd., Tokyo, Japan

Filed Oct. 24, 1986, Ser. No. 922,602
Claims priority, application Japan, Nov. 25, 1985, 60-264590
Int. Cl.[4] H03F 3/60
U.S. Cl. 330—286 **6 Claims**



1. A device for converting a transmission mode of a microwave signal applied to said device and amplifying said signal so as to output said amplified signal, comprising:

a hollow conductive waveguide having a predetermined cross-section and shorted at one end of said waveguide;

a pickup probe mounted on said waveguide adjacent to said one end for converting the transmission mode of said microwave signal which is applied to said waveguide;

matching means disposed between said one end and the other end of said waveguide for adjusting an impedance of said waveguide;

an amplifier element having an input terminal which is directy interconnected to an output terminal of said pickup probe; and

a microstrip line having an input terminal interconnected to an output terminal of said amplifier element and an output terminal interconnected to a subsequent circuit element which is located outside said device.

4,716,383

PRECISE PHASE START-UP VOLTAGE CONTROLLED OSCILLATOR WITH ACCURATE DUTY CYCLE

Karl M. J. Lofgren, Long Beach; Gerald W. Shearer, Orange, and Kenneth W. Ouyang, Huntington Beach, all of Calif., assignors to Western Digital Corporation, Irvine, Calif.

Filed Jun. 23, 1986, Ser. No. 877,367
Int. Cl.[4] H03K 3/02
U.S. Cl. 331—117 FE **14 Claims**

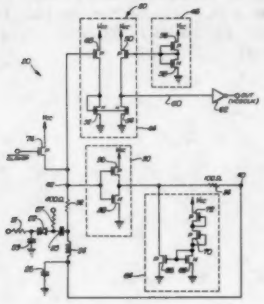
1. A voltage controlled oscillator for producing a square wave with a precise duty cycle, comprising:

oscillating means for generating a periodic signal substantially symmetrical about a central voltage level at a first node;

means for supplying at a reference node a reference voltage substantially equal to the central voltage level; and

a two-input comparator with a first input coupled to the first node and a second input coupled to the reference node,

the comparator providing a first logic level at a comparator output when the voltage at the first node is greater than the voltage at the second node and otherwise providing a second logic level.



4,716,384
MODULATORS

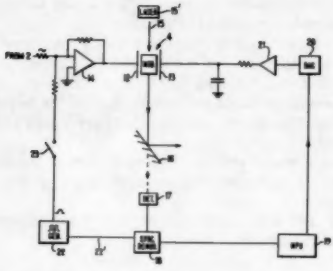
Malcolm D. M. Roe, London, and Michael E. Hicks, Tring, both of England, assignors to Crosfield Electronics Limited, London, England

Filed Apr. 25, 1985, Ser. No. 727,325

Claims priority, application United Kingdom, May 1, 1984, 8411079; Nov. 5, 1984, 8427912

Int. Cl.⁴ H01S *3/10*; H04N *5/76*; G01D *15/14*

U.S. Cl. 332—7.51 **10 Claims**



1. In the exposing of a record medium to radiation in which, during an exposing stage, said radiation passes through a modulator which comprises a device for controlling the transmission of radiation passing through the modulator in accordance with an applied control function, the response characteristic of the modulator to the control function exhibiting a maximum or minimum such that the exposure of said record medium to said radiation is controlled by applying a first control function to said modulator, a method of compensating for changes in the response characteristic of the modulator, comprising the steps of: applying a test control function having a DC component and a cyclically varying component to said modulator; monitoring radiation transmitted through said modulator; detecting the phase relationship between the cyclical component of said transmitted radiation and said cyclically varying component of said test control function to determine the position of said DC component of said test control function along said response characteristic of said modulator; and determine a correction function for application to said modulator to compensate for any change in said response characteristic, where said test control function applying, transmitted radiation monitoring, phase relationship detecting, and correction function determining steps are implemented during a compensation stage preceding said exposing stage.

4,716,385
MULTILEVEL MODULATOR COMPRISING A COMPACT ERROR CORRECTING CODE PRODUCING UNIT

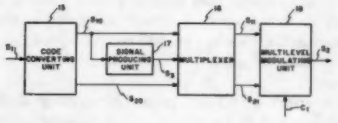
Seiichi Noda, and Makoto Yoshimoto, both of Tokyo, Japan, assignors to NEC Corporation, Japan

Filed Jul. 23, 1986, Ser. No. 889,804

Claims priority, application Japan, Jul. 24, 1985, 60-164695; Aug. 23, 1985, 60-184015

Int. Cl.⁴ H03K *7/00, 9/00*

U.S. Cl. 332—9 R **9 Claims**



1. A multilevel modulator responsive to an input digital signal having a plurality of levels for modulating a carrier signal into a multilevel modulated signal, wherein the improvement comprises:

code converting means for converting said input digital signal into a major converted signal and a minor converted signal, said major converted signal having rearranged groups, each group consisting of a first predetermined number of levels, said minor converted signal having a second predetermined number of levels related to the respective groups;

signal producing means responsive to said major converted signal for producing a Lee-error correcting code sequence;

multiplexing means for multiplexing said error correcting code sequence and said major converted signal into a major multiplexed signal and said error correcting code sequence and said minor converted signal into a minor multiplexed signal; and

modulating means for modulating said carrier signal by said major and said minor multiplexed signals into said multilevel modulated signal.

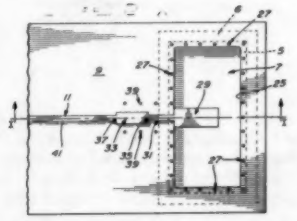
4,716,386
WAVEGUIDE TO STRIPLINE TRANSITION

Andrew J. Lait, Kanata, Canada, assignor to Canadian Marconi Company, Montreal, Cansda

Filed Jun. 10, 1986, Ser. No. 872,676

Int. Cl.⁴ H01P *5/107*

U.S. Cl. 333—26 **8 Claims**



1. An arrangement for effecting a waveguide to stripline transition, wherein:

said waveguide comprises an input waveguide section and a separate short circuit waveguide section;

said input waveguide section and separate short waveguide

circuit section each section comprising a hollow interior of substantially the same size and shape enclosed by a surrounding wall;

said stripline comprising a copper track sandwiched between a first dielectric plate and a second dielectric plate;

a first ground plane on the surface of the first dielectric plate removed from said copper track, and a second ground plane on the surface of said second dielectric plate removed from said copper track;

said input waveguide section and said short circuit waveguide section being disposed in spaced alignment such that the surrounding walls and hollow interiors thereof are in alignment;

a portion of the striline being disposed in the space between the input waveguide section and the short circuit waveguide section such that the first ground plane is in contact with the cross-sectional surface of the input waveguide section and the second ground plane is in contact with the cross-sectional surface of the short circuit waveguide section;

a first aperture in said first ground plane of substnatially the same size and shape as said hollow interior and a second aperture in the second ground plane of substantially the same size and shape as said hollow interior, the first and second apertures being in alignment with each other and being located in said portion of said stripline and in alignment with the hollow interiors of said input section and said short circuit section;

means disposed between the surrounding wall of said input section and the surrounding wall of said short circuit section to simulate a continuation of said waveguide walls, said means extending only between the outer surfaces of said first and second ground planes;

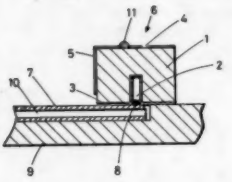
whereby to improve the match in the transition and to thereby reduce losses at the transition.

4,716,387

WAVEGUIDE-MICROSTRIP LINE CONVERTER

Sadao Igarashi, Soma, Japan, assignor to Alps Electric Co., Ltd., Japan

Filed Sep. 25, 1986, Ser. No. 911,400
Claims priority, application Japan, Sep. 30, 1985, 60-150551
Int. Cl.[4] H01P *5/107*
U.S. Cl. 333—26 **10 Claims**



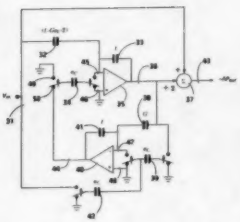
1. A waveguide-microstrip line converter to be connected to a waveguide for mode conversion in transmitting a signal from the waveguide to a microstrip line, which comprises: a cuboidal dielectric body having a hole formed in one surface thereof; a probe formed by forming a conductive layer over the inner surface of the hole formed in the cuboidal dielectric body so as to be connected to a microstrip line; and a conductive layer formed over the surface of the cuboidal body excluding at least one surface of the cuboidal dielectric body to be brought into contact with the waveguide, an area surrounding the probe, and an area to be disposed opposite the microstrip line.

4,716,388

MULTIPLE OUTPUT ALLPASS SWITCHED CAPACITOR FILTERS

Gordon M. Jacobs, 6622 Chabot Rd., Oakland, Calif. 94618

Filed Dec. 24, 1984, Ser. No. 685,319
Int. Cl.[4] H03H *19/00, 11/12, 11/34*
U.S. Cl. 333—173 **7 Claims**



1. A multiple output allpass biquadratic filter comprising:

a biquadratic filter section having an input port and an output port and exhibiting either a bandpass or bandstop frequency response characteristic at said output port when a signal is applied to said input port;

a two input summation circuit whose output port produces the sum of the signals present at its two input ports according to the equation

$$V_{out}=aV_1+bV_2$$

where V_{out} is the signal at the summation circuit output port, V_1 is the signal at the summation circuit first input port, V_2 is the signal at the summation circuit second input port, and both the constants a and b can be positive or negative but not equal to zero;

a signal input terminal connected to both the input port of said biquadratic filter section and the first input port of said summation circuit;

a connection between the output port of the biquadtradic filter section and the second input port of said summation circuit;

a primary output terminal having an allpass frequency response characteristic that is the output port of the addition circuit;

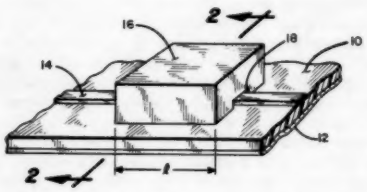
a secondary output terminal that is the output port of the biquadratic filter section.

4,716,389

MILLIMETER WAVE MICROSTRIP SURFACE MOUNTED ATTENUATOR

Michael J. Gawronski, Minneapolis, and John R. Lamberg, Minnetonka, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Oct. 20, 1986, Ser. No. 920,964
Int. Cl.[4] H01P *1/22, 1/23*
U.S. Cl. 333—81 A **4 Claims**



1. An attenuator for a microstrip transmission line assembly

of the type having an elongated conductive microstrip spaced from a conductive ground plane by a layer of solid dielectric material, comprising:

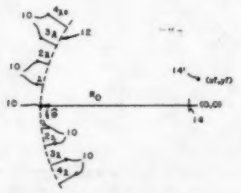
a substantially rigid, non-deformable block of electromagnetic energy absorbing material, said block having at least one planar surface, save for a groove formed inwardly of said planar surface into said block, said block resting on said layer of solid dielectric material with said conductive microstrip aligned with said groove so as to straddle only said conductive microstrip in a non-contact relationship and only over a predetermined length of said conductive microstrip.

4,716,390

MAGNETOSTATIC WAVE CHANNELIZER

Jeffrey H. Elliott, Santa Monica; Robert B. Stokes, Torrance; David Penunuri, Placentia, and Kuo-Hsiung Yen, Manhattan Beach, all of Calif., assignors to TRW Inc., Redondo Beach, Calif.

Filed Sep. 15, 1986, Ser. No. 907,546
Int. Cl.[4] H01P *1/20, 1/213*
U.S. Cl. 333—202 **10 Claims**



1. A magnetostatic wave (MSW) device for processing of multifrequency input signals, the device comprising:

an MSW propagating medium;

means for applying a magnetic bias field to the propagating medium;

input transducer array means responsive to the input signals and providing a spatially modulated transduction coupling strength along an arcuate path on the propagating medium, wherein the arcuate path is selected to provide multiple sources of magnetostatic waves that combine constructively at frequency-dependent points in a focal region of the propagation medium; and

a plurality of output transducers positioned on the propagating medium at frequency-dependent points in the focal region, to provide output signals indicative of the various frequency components of the input signal.

4,716,391

MULTIPLE RESONATOR COMPONENT-MOUNTABLE FILTER

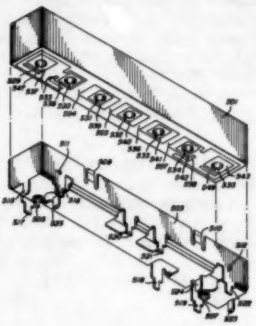
Michael F. Moutrie, Buffalo Grove; Raymond L. Sokola, Lake Zurich, both of Ill., and Phillip J. Gordon, Carmel, Ind., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jul. 25, 1986, Ser. No. 890,682
Int. Cl.[4] H01P *1/205*
U.S. Cl. 333—206 **12 Claims**

1. A substrate mountable filter comprising:

(a) a dielectric filter means comprised of a dielectric material and having first, second, and side surfaces, said second and side surfaces of said dielectric material being substantially covered with a conductive material; a plurality of holes having surfaces substantially covered by a conductive material which extends from the first surface of the dielectric material toward the second surface thereof and which has openings on the first surface of the dielectric material that are disposed at predetermined distances relative to one another; first and second electrode means disposed on said first surface and each coupled to said conductive material covered surface of a separate one of said plurality of holes; and first and second coupling means disposed on said first surface and coupled respectively to said first and second electrode means and the respective conductive hole surface coupled thereto; and

(b) a mounting means comprised of a conductive material having a recessed area for accepting and holding said dielectric filter means and an interior surface within said recessed area disposed essentially parallel to said first



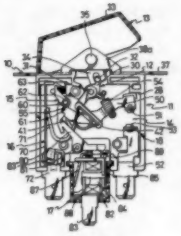
surface of said dielectric material; first and second terminal means extending through said interior surface, disposed opposite said first and second coupling means, and providing electrical contact respectively thereto; and a plurality of mounting tabs disposed at predetermined positions opposite said recessed area whereby said dielectric filter means and mounting means may be mounted on a substrate.

4,716,392

POWER SUPPLY SWITCH

Kunimitsu Nakano, and Hiroyuki Onishi, both of Kadoma, Japan, assignors to Matsushita Electric Works, Ltd., Japan

Filed Feb. 7, 1986, Ser. No. 827,144
Int. Cl.[4] H01H *3/00*
U.S. Cl. 335—189 **12 Claims**



1. A power supply switch comprising a housing, an operating member pivotably supported substantially at the middle of said housing, a movable contactor provided at one end with a movable contact engageable with and disengageable from a fixed contact and at the other end with a latch part, resilient means for linking between one end of said operating member and substantially the central part of said movable contactor, a tension spring engaged at one end of the movable contactor to the other end of the operating member and at the other end to the movable contactor at a position between the linking point of said link means and said one end having said movable contact of said movable contactor for biasing the movable contactor in a direction of disengaging from said fixed contact, means engageable with said latch part of the movable contac-

tor for latching the contactor into a contact closing position of engaging the movable contact with said fixed contact as the contactor is moved with a rotation of the operating member, with the linking point of the operating member to the link means shifted beyond an imaginary line connecting between the pivoting axis of the operating member and said linking point of the link means to the movable contactor said resilient linking means being slightly compressed in said contact closing position of the movable contactor for providing thereto a contact pressure to the fixed contact, means engaged with said latch means for biasing it in a direction of engaging with said latch part of the movable contactor, and means engaged with the latch means for tripping the latch means out of engaging position with the latch part against the force of said biasing means to forcibly break the contacts.

4,716,393

ELECTROMAGNETIC ACTUATOR

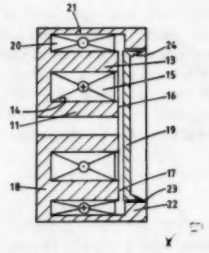
Frank M. Logie, London, England, assignor to Lucas Industries public limited company, Birmingham, England

Filed May 22, 1986, Ser. No. 886,564

Claims priority, application United Kingdom, Jun. 8, 1985, 8514544

Int. Cl.[4] H01F *7/08*

U.S. Cl. 335—261 **2 Claims**



1. An electromagnetic actuator comprising a core structure having a central pole piece defining a pole face, at least one annular pole piece surrounding the central pole piece in spaced relationship and defining an annular pole face, said spaced relationship between said central pole piece and said annular pole piece defining an annular recess, at least one electric winding located in the annular recess, said winding, when energized, causing adjacent pole faces to assume opposite magnetic polarity, an armature formed from magnetic material, said armature, when said winding is energized, being attracted towards said pole faces, an annular core component extending alongside but spaced from the outer pole piece by a recess containing at least one further winding, said core component extending beyond said pole faces and defining a radial air gap with the armature.

4,716,394

BOBBIN DEVICE

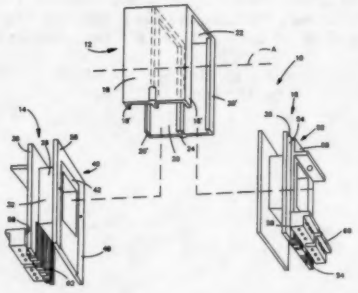
Albert Gordon, Beachwood, Ohio, assignor to Cosmo Plastics Company, Cleveland, Ohio

Filed Mar. 12, 1987, Ser. No. 25,067

Int. Cl.[4] H01F *27/30*

U.S. Cl. 336—192 **11 Claims**

1. A transformer coil assembly comprising a shroud member having a pair of bobbin members removably mounted therein; each of said bobbin members comprising a central core adapted to extend along an axis of the assembly between an end flange and a mating flange, said flanges extending transversely of said core and providing a winding area therebetween, said mating flanges of said bobbin members including mating faces adapted to be disposed in adjacent relationship when said bobbin members are mounted in said shroud member to provide said assembly, said mating faces including first mounting surfaces which engage upon assembly of the bobbin members, second mounting surfaces which cooperate to provide a mounting channel, and interengaging means for indicating axial and angular alignment of the bobbin members in a subassembly position with engagement of said first mounting surfaces and provision of the mounting channel, said end flanges having axially outboard faces including spaced slide mounting surfaces for engagement with said shroud member, said shroud member having a U-shaped configuration including a bight adapted to extend along the top of the assembly between a pair of legs spaced from said assembly axis, said shroud member including a transversely inwardly extending rib located at an intermediate location along its axial length for engagement within said mounting channel, each of said shroud legs including axially spaced transversely inwardly projecting leg guides for engaging one of the slide mounting surfaces on each of said end flanges, said leg guides of each leg being axially spaced by a distance equal to the axial spacing of said end flanges of said bobbin members when said first mounting surfaces are engaged, said shroud member being adapted to receive said bobbin members in said proper subassembly position between the shroud legs in a sliding frictional fit with engagement of said rib within said mounting channel and intermediate rib engagement whereby said bobbin members are reliably assembled upon transverse relative movement within said shroud member with said leg guides engaging said slide mounting surfaces and axially confining said bobbin members within said shroud member.



4,716,395

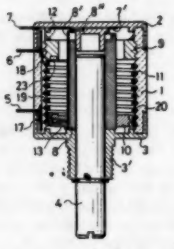
MULTI-ROTATION TYPE POTENTIOMETER

Eitaro Shimoda, Kawasaki, Japan, assignor to Sakae Tsushin Kogyo Co., Ltd., Kanagawa, Japan

Filed Feb. 9, 1987, Ser. No. 12,352

Int. Cl.[4] H01C *10/24*

U.S. Cl. 338—149 **9 Claims**



1. A multi-rotation type potentiometer comprising:

(a) a cylindrical shaped housing member having a spiral-shaped screw groove formed on its inner surface;

(b) a spiral-shaped resistance element having a predetermined number of turns and received by said screw groove of said housing member;

(c) two end terminals respectively attached to said housing member one ends of which are respectively connected to both ends of said resistance element through connection leads;

(d) a rotarty shaft attached with a cylindrical rotor, said rotary shaft rotatably assembled to said housing member such that said cylindrical rotor is located within said housing member along its center axis;

(e) a slipping lever fixed to an outer surface of said cylindrical rotor along its axis direction;

(f) a ring-shaped sliding member having inner and outer contacts and a guide member and engaged with said rotor such that when said rotary shaft and hence said rotor are rotated, said sliding member is rotated together with said rotor and also slid in an up and down direction on said rotor by an engagement of said guide member with said resistance element, while its inner and outer contacts respectively contact with said slipping lever and said resistance element;

(g) an output terminal having a slip-ring and attached to said housing member such that said slip-ring contacts with one end of said slipping lever; and

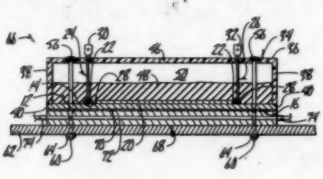
(h) a stopper member screwed into said housing member to prevent said sliding member from being rotated at a revolution number exceeding a predetermined revolution number.

4,716,396

HIGH POWER DENSITY, LOW CORONA RESISTOR

Jerome J. Kneifel, Bellwood, Nebr., assignor to Dale Electronics, Inc., Columbus, Nebr.

Filed Jul. 10, 1986, Ser. No. 884,201
Int. Cl.[4] H01C 1/02
U.S. Cl. 338—225 **13 Claims**



1. A high power density, low corona resister adapted to be mounted on a heat sink surface, said resister comprising:

a housing member having a top wall and a plurality of side walls forming a cavity within said housing, said side walls having bottom edges defining a bottom opening in said housing;

a dielectric thermally conductive substrate having an upper surface and a lower surface, at least a portion of said upper surface being positioned in covering relation over said bottom opening of said housing, said lower surface being substantially planar and having a plurality of microscopic indentations therein;

a resistance element mounted upon said upper surface of said substrate, said resistance element comprising a single thin film of electrically conductive material in intimate contact with said upper surface of said substrate;

a first lead means and a second lead means each having first and second ends, both of said first ends being above said upper surface of said substrate and being electrically connected to said resistance element;

an electrically insulative material covering said resistance element and said first ends of said pair of leads to provide physical, environmental and structural protection to said resistance element and said first ends of said pair of lead means, said second ends of said leads protruding outside said insulative material and upwardly therefrom and extending through and outside said housing member;

an electrically conductive sheet operatively secured to said lower surface of said substrate and being in intimate contact with said lower surface of said substrate so as to substantially fill said microscopic indentations therein and substantially eliminate voids capable of causing corona phenomena between said lower surface and said conductive sheet; and

said substrate being the only dielectric material between said resistance element and said electrically conductive sheet so as to eliminate dielectric materials of more than one dielectric constant therebetween and thereby minimizing corona phenomena between said resistance element and said conductive sheet;

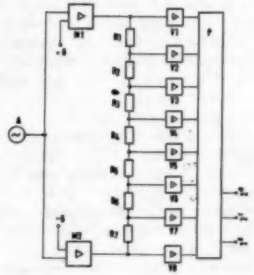
securing means securing said housing member to said substrate and being adapted to attach said housing member and said substrate to said heat sink surface with said conductive sheet in heat conducting contact with said heat sink surface.

4,716,397

METHOD AND APPARATUS FOR VERY HIGH SPEED ANALOG-TO-DIGITAL CONVERSION

Hans Werba, Theresienstrasse 11, D-8390 Passau, Fed. Rep. of Germany, and Rudolf Schlögel jun., Im Tal 9, A-6060 Absam (Tirol), Austria

Filed Mar. 21, 1985, Ser. No. 714,387
Claims priority, application Fed. Rep. of Germany, Mar. 23, 1984, 3410796; Jul. 10, 1984, 3425399
Int. Cl.[4] H03M 1/36
U.S. Cl. 340—347 AD **8 Claims**



1. A method for analog/digital conversion, comprising the steps of:

amplitude modulating a first d.c. voltage signal with an analog signal to be digitized;

amplitude modulating a second d.c. voltage signal with the analog signal to be digitized, said first and second voltage signals having the same voltage value but opposite polarity;

feeding said amplitude modulated first d.c. voltage signal into a first end of a chain of resistors and the amplitude modulated second d.c. voltage signal into a second end of the chain of resistors;

detecting a voltage divider point in the chain of resistors at which cancellation of the amplitude modulated d.c. voltage signals fed into the first and second ends of the chain of resistors occurs; and

assigning the voltage divider point a first binary value and all

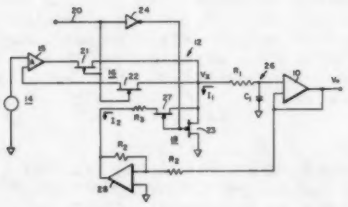
other resistor voltages a second binary value to produce a binary value pattern characterizing the converted analog signal value.

4,716,398

LINEARITY CONTROL CIRCUIT FOR DIGITAL TO ANALOG CONVERTER

Larry E. Eccleston, Edmonds, and John C. Emery, Everett, both of Wash., assignors to John Fluke Mfg. Co., Inc., Everett, Wash.

Filed Feb. 26, 1987, Ser. No. 19,427
Int. Cl.[4] H03M *1/66*
U.S. Cl. 340—347 DA **16 Claims**



4. In a digital to analog converter having an input amplifier receiving a pulse width modulated signal and first and second controlled switching devices for transmitting first and second voltages to an input of said input amplifier in a modulated manner, said first and second controlled switching devices connected to said input of said input amplifier, wherein said first controlled switching device is connected to a first voltage level and said second controlled switching device is connected to a second voltage level, the improvement comprising:

resistance eliminating means for eliminating resistance of at least one of said switching devices from affecting an output voltage produced by said input amplifier,

said resistance eliminating means including withdrawing means for withdrawing from said at least one switching device an amount of current substantially equal to the current provided to said at least one switching device from said input of said input amplifier,

said withdrawing means including:

amplifier means connected between an output of said input amplifier and said at least one switching device,

gain control means for controlling gain of said amplifier means thereby to provide an output voltage of said amplifier means as a predetermined function of an output voltage at said output of snid input amplifier,

current control means for providing a current value as a predetermined function of said output voltage of said amplifier means,

said current control means connected to obtain said current value from said at least one switching device,

whereby all current provided to said at least one switching device from said input terminal of said input amplifier is withdrawn by said withdrawing means.

thereby substantially eliminating any effects of internal resistance of said at least one switching device from affecting output voltage or current of said input amplifier.

4,716,399

OPTOMECHANICAL CONTROL APPARATUS

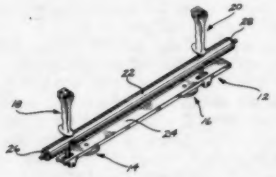
Lester H. Nordlund, Federal Way, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Jan. 14, 1985, Ser. No. 691,167
Int. Cl.[4] G08C *9/00*
U.S. Cl. 340—365 P **13 Claims**

1. A control apparatus, comprising:

A support structure;

a joystick assembly mounted to the supported structure, the joystick assembly including at least two joysticks, and mounting means for mounting the joysticks such that the joysticks can rotate in unison about common first and second axes that are not parallel to one another, the mounting means including a coupling member coupled to the joysticks such that rotation of the joysticks about the first axis causes a first characteristic movement of the coupling member, and rotation of the joysticks about the second axis causes a second characteristic movement of the coupling member; and



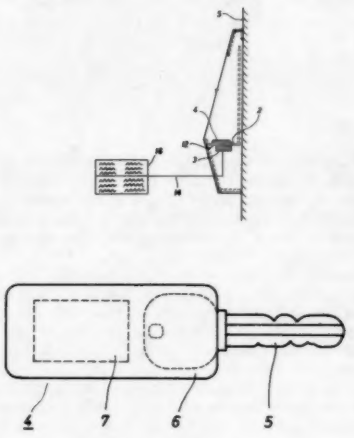
position measuring means, including a two-axis photodetector and illumination means for directing a beam of radiation to a point on the photodetector, the position measuring means cooperating with the coupling member to vary the position of the point along a first axis of the photodetector as the coupling member undergoes its first characteristic movement and to vary the position of the point along a second axis of the photodetector as the coupling member undergoes its second characteristic movement.

4,716,400

KEY SENSING SYSTEM

Yukio Kuribayashi, Soka, Japan, assignor to Aica Kogyo Co., Ltd., Nagoya, Japan

Filed Feb. 7, 1986, Ser. No. 827,063
Claims priority, application Japan, Jun. 7, 1985, 60-86176
Int. Cl.[4] G08B *13/14*
U.S. Cl. 340—572 **4 Claims**



1. A key sensing system, said system including a keyholder having a non-magnetic portion with a magnet disposed therein and a key fixedly attached thereto, comprising:

a keysensor housing having a front surface and a rear surface, said front surface having a cavity therein and said cavity having a plate-like portion positioned substantially perpendicularly with respect to said rear surface, said plate-like portion being configured to receive said non-

magnetic portion of said keyholder in a plurality of orientations relative to said rear surface; and

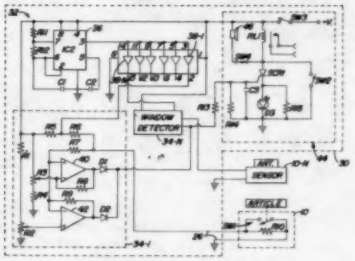
at least one magnetic sensor positioned in said keysensor housing immediately below said plate-like portion for sensing said magnet disposed in said non-magnetic portion of said keyholder when said non-magnetic portion is positioned on said base in one of said plurality of orientations.

4,716,401

TAMPER-RESISTANT SUPERVISORY SYSTEM

William P. Wohlford, Bettendorf, and LaVern B. Hovenga, Davenport, both of Iowa, assignors to Deere & Company, Moline, Ill.

Filed Sep. 19, 1985, Ser. No. 777,647
Int. Cl.[4] G08B *13/14*
U.S. Cl. 340—568 **11 Claims**



1. A supervisory system comprising:

a sensor unit including an electrical parameter which varies as a function of presence and absence of an article to be supervised;

a conducting cable;

a monitoring unit connected to the sensor unit via the cable, the monitoring unit comprising:

a first source of potential having a first characteristic;

a second source of potential having a second characteristic which is different from the first characteristic, at least one of the sources producing a periodically varying potential;

an impedance network connected to the first and second potential sources and to the cable, the impedence network producing a status signal having a component with the first characteristic and having a component with the second characteristic, the status signal varying as a function of the electrical parameter of the sensor unit and as a function of the condition of the cable; and

means for generating an alarm signal in response to changes in the status signal, the alarm signal generating means comprising a comparator having a first input connected to the impedence network to receive the status signal, having a second input connected to receive a reference signal and having an output, the comparator producing a signal at its output which depends upon signals applied to its inputs.

4,716,402

MODULAR PERSONAL SECURITY DEVICE

Paul S. Francis, 4603 Homestead Dr., Prairie Village, Kans. 66208

Filed Nov. 12, 1985, Ser. No. 796,991
Int. Cl.[4] G08B *19/00*
U.S. Cl. 340—693 **19 Claims**

1. A security device for carrying on the person, said device comprising:

a housing having a size to be held in the hand;

a flashlight bulb in said housing for emitting light when energized to provide illumination of the area into which the light from the bulb is directed;

a buzzer in said housing for emitting an audible alarm signal when energized;

a battery in said housing for supplying power to said bulb and buzzer to energize same;

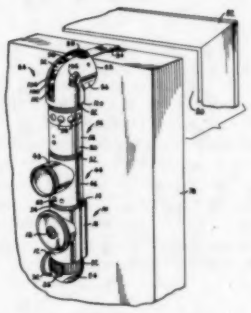
a switch on said housing having an off condition wherein said bulb is deenergized and an on condition wherein said bulb is energized steadily;

a socket in said housing;

a pin in said socket, said pin being removable from said socket and being accessible to be pulled out of the socket and detached from the housing;

means for successively energizing and deenergizing said bulb to emit a flashing alarm light in a response to removal of said pin from said socket;

means for successively energizing and deenergizing said buzzer to emit a series of said audible alarm signals in succession in response to removal of said pin from said socket;



a mounting unit for said housing having first and second ends, said first end of the mounting unit having means for securing same to a supporting surface and said second end being adapted for detachable physical and electrical connection to said housing in a manner to receive power from said battery;

intrusion detecting means associated with said mounting unit and powered by said battery for detecting an intrustion and applying an electrical intrusion signal to said second end when an intrusion is detected; and

means for steadily energizing said bulb and successively energizing and deenergizing said buzzer when said electrical intrusion signal is applied to said housing through said second end of the mounting unit.

4,716,403

LIQUID CRYSTAL DISPLAY DEVICE

Shinji Morozumi, Suwa, Japan, assignor to Seiko Epson Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 472,358, Mar. 4, 1983, Pat. No. 4,600,274. This application May 21, 1985, Ser. No. 736,612
Claims priority, application Japan, Oct. 1, 1982, 57-173513
Int. Cl.[4] G09G *3/36*
U.S. Cl. 340—702 **24 Claims**

1. A liquid crystal display having a plurality of color picture elements of three primary colors arranged in a matrix of rows and columns, the display having two opposed substrates, a matrix of color filters and a common electrode on one substrate and each picture element having a driving electrode and an associated single color filter on the opposed substrate, comprising:

driving circuit means for receiving three primary color signals;

color selection means for selecting sequentially for input to said driving circuit means each one of said three primary color signals said color selection means including a

switching means, said switching means having three color inputs, each one of the three color inputs being for receiving an input signal of one of said primary colors, said switching means having three color outputs, each one of the color outputs being connected to said driving means; and a control means for causing said switch means to sequentially connect each one of said color outputs to each one of said color inputs, in a sequence of color signal

selection corresponding to a physical arrangement of colors of said picture elements; and

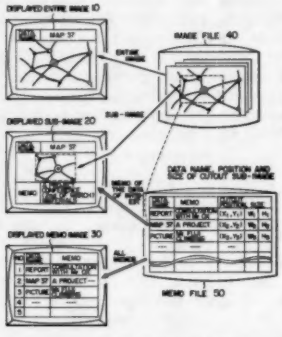
element selecting means for selecting said picture elements in sequence, said driving circuit means applying selected color signals from said color selection means to driving electrodes of a corresponding color in said selected picture element, said element selecting means having timing signal inputs for receiving timing signals to time said selection of picture elements in sequence for driving.

4,716,404

IMAGE RETRIEVAL METHOD AND APPARATUS USING ANNOTATIONS AS GUIDANCE INFORMATION

Kuniaki Tabata, Tokyo, and Susumu Tsuhara, Sagamihara, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 29, 1984, Ser. No. 594,690
Claims priority, application Japan, Apr. 1, 1983, 58-55073
Int. Cl.[4] G09G *1/00*
U.S. Cl. 340—723 **8 Claims**



1. An image retrieval method using a display system comprising the steps of:

(a) storing a plurality of images in first memory means;

(b) designating a partial area defining a sub-image for each image stored in said first memory means;

(c) storing extracting information representing the position of the designated partial area in a corresponding image, reference data associated with said image and image designating information in a second memory;

(d) displaying a plurality of pairs of image designating information and reference data read out of said second memory means for image retrieval;

(e) selecting one of the image designating information by referring to the displayed reference data;

(f) reading out an image corresponding to the selected image designating information from said first memory means and extracting a sub-image from said read-out image on the basis of said extracting information corresponding to said image designating information;

(g) displaying the extracted sub-image together with said reference data associated therewith; and

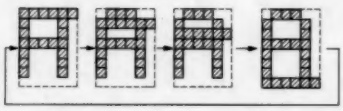
(h) displaying an entire image corresponding to the selected image designating information.

4,716,405

FLAT PANEL DISPLAY CONTROL APPARATUS

Noboru Yamaguchi, Oome, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Oct. 30, 1985, Ser. No. 792,844
Claims priority, application Japan, Oct. 31, 1984, 59-229221
Int. Cl.[4] G09G *1/16*
U.S. Cl. 340—723 **12 Claims**



1. A flat panel display control apparatus comprising:

a flat panel display device for displaying each character by a plurality of dots in a matrix form;

pattern storing means for storing a character pattern of a character to be displayed;

means for storing attribute data of each character stored in said pattern storing means; and

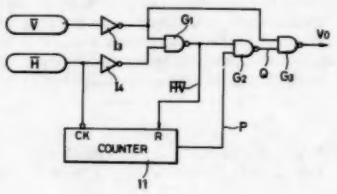
attribute control means for reading out the character pattern and the attribute data thereof, and for supplying the character pattern to said flat panel display device by superimposing a cyclically moving dot or dots on the character pattern when the attribute data indicates a high-light intensity display.

4,716,406

SEQUENTIAL SELECTION CIRCUIT

Toshio Shionoya, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Apr. 22, 1985, Ser. No. 725,816
Claims priority, application Japan, Apr. 25, 1984, 59-83330
Int. Cl.[4] G09B *3/28*
U.S. Cl. 340—814 **5 Claims**



1. A sequential selection circuit which selects series of circuits, elements and, electrodes over a long period to activate them sequentially one by one for a short period, comprising a shift register which has a number of shift stages corresponding to the total number that is to be selected, for sequentially shifting a single input pulse in response to clock pulses corresponding to the short period; a counter for counting the clock pulses so as to generate an output voltage level which is low

when the count reaches the total number to be selected; an input circuit for generating an input pulse for said shift register depending on the voltage level from the counter and a pulse corresponding to the long period; and a reset circuit for resetting said counter in accordance with the clock pulse and the pulse corresponding to the long period.

4,716,407

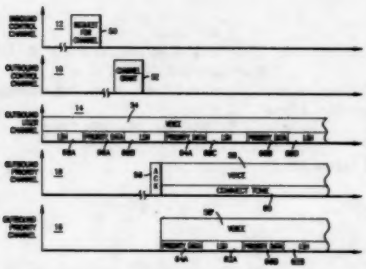
TRUNKED COMMUNICATION SYSTEM TRUE PRIORITY CHANNEL SCAN

Jaime Andres Borras, Hialeah, Fla.; Michael D. Sasuta, Palatine, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Continuation-in-part of Ser. No. 785,173, Oct. 7, 1985, abandoned. This application Dec. 19, 1986, Ser. No. 945,210

Int. Cl.[4] H01H *67/00*; **H04B** *11/32, 7/00*

U.S. Cl. 340—825.04 **35 Claims**



1. In a trunked communication for communicating messages of varying priority levels having at least one central station for allocating a limited number of communication channels among a plurality of subscribers units each having an identification (ID) code stored therein and constructed and arranged to communicate information on any of the communication channels, a method for any of the plurality of subscribers receiving a current message on a current communication channel to respond to a priority message on another communication channel comprising the steps of:

(a) receiving priority data from the central station on the current communication channel;

(b) determining the priority level of the priority message from said priority data;

(c) comparing the priority level of the priority message to the priority level of the current message;

(d) abandoning the current message and responding to the priority message if said priority level of the priority message at least exceeds that of the current message.

4,716,408

DATA TRANSMISSION SYSTEM OF THE STAR TYPE WITH ENABLEMENT PASSING

Stuart O'Connor, Glossop; Donald Bell, Stockport; Trevor R. Fox, Warrington, and Paul Townsend, Middleton, all of United Kingdom, assignors to International Computers Limited, London, England

Filed Apr. 16, 1984, Ser. No. 600,416

Claims priority, application United Kingdom, Apr. 21, 1983, 8310821

Int. Cl.[4] H04Q *1/00*

U.S. Cl. 340—825.5 **11 Claims**

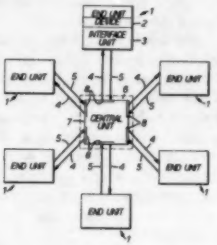
1. A data communication system comprising a plurality of stations between which communication is to take place and coupling means,

each station being connected to the coupling means by an inward channel for the transmission of data from the station to the coupling means and an outward channel for the transmission of data from the coupling means to the station, the channels of each station being distinct from those of every other station,

each station having means for detecting an entitlement indication received over its inward channel, which indication confers an entitlement on the station to transmit user data,

user data being transmitted in frames, the stations being in a predetermined cyclic sequence in which each station has a successor station, and

the coupling means comprising:



means responsive to receipt of a frame over the inward channel from any station for retransmitting that frame on to the outward channels of the other stations, whereby the frame is broadcast to those other stations, and

means responsive to receipt of an indication from any station, indicating that the station is relinquishing its entitlement to transmit user data, for transmitting an entitlement indication solely on to the outward channel of that station's successor station.

4,716,409

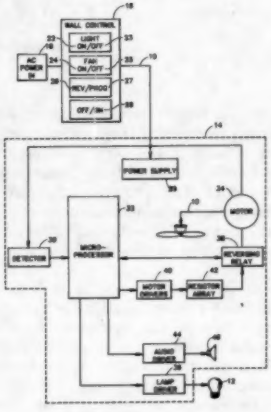
ELECTRICAL APPLIANCE CONTROL SYSTEM

Edward F. Hart, Yorba Linda, and William McDonough, El Toro, both of Calif., assignors to Homestead Products, Inc., Ramona, Calif.

Filed Jul. 16, 1986, Ser. No. 886,249

Int. Cl.[4] G05B *19/02*; **H04M** *11/04*

U.S. Cl. 340—825.22 **30 Claims**



1. A system for remotely controlling at least two electrical appliances powered by an AC power source, comprising:

a series of manually operable switches;

control signal generating means responsive to actuation of the switches for providing a firing delay in the AC sine wave after a zero crossing; each switch corresponding to a delay signal of predetermined length in a predetermined

polarity half of the AC signal distinct from all the other switch signals;

delay signal detecting means connected to said generating means for detecting said delay signals and producing control pulses in response to said delay signals; said detecting means comprising first control means for detecting the polarity of the delayed half of an input AC signal and producing an output polarity control signal, and second control means for producing a control signal pulse of length dependent on the half cycle length of the input AC signal, each control signal pulse produced by said delay signals having a predetermined length shorter than the standard AC half cycle pulse length; and

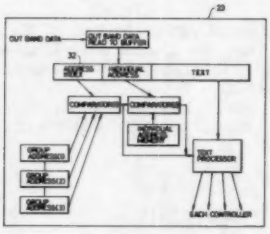
programmable control means for controlling operation of said electrical appliances in response to stored program instructions and detection of said polarity control signals and control signal pulse length; said program instructions including means for associating each shortened control signal pulse length of each polarity with a predetermined control function, said control functions including means for switching each appliance on and off, and means for initiating a series of pre-programmed sequences of operations of said appliances.

4,716,410

CATV DATA TRANSMISSION METHOD

Takashi Nozaki, Tokyo, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Continuation of Ser. No. 681,748, Dec. 14, 1984, abandoned.
This application May 27, 1987, Ser. No. 56,351
Claims priority, application Japan, Dec. 16, 1983, 58-238360
Int. Cl.[4] H04Q *9/14*; H04N *7/00*
U.S. Cl. 340—825.520 **1 Claim**



1. A CATV data transmission method, in which data is transmitted from a transmitting side to a receiving side having a first plurality of individual terminal units, each of said units having assigned an individual address, comprising:

assigning said terminal units to a second plurality of groups, each of said groups containing one or more of the terminal units, that receive collectively data transmitted from said transmitting side and are intended for each terminal in said group;

assigning a unique group address to each of said groups, thereby defining a second plurality of group addresses;

storing at each terminal unit a reference signal and at least two addresses, comprising an individual address and any applicable unique group addresses, said stored applicable unique group addresses comprising all of the unique group addresses for those of said groups to which said terminal unit is assigned;

transmitting from said transmitting side to all terminal units in common at said receiving side, a transmitted signal comprising at least (i) data intended for an individual terminal unit together with an individual address and a group address pattern, comprising at least one of said unique group addresses, or (ii) data intended collectively for one of said second plurality of groups together with a group address pattern, comprising at least one of said unique group addresses;

at each terminal unit, receiving at least said transmitted data and said group address pattern;

in each terminal unit:

initially comparing a portion of said received group address pattern with said reference signal and generating a first signal if said portion and said reference signal are identical and generating a second signal if said portion and said reference signal are not identical;

comparing a stored individual address with said transmitted signal in response to the generation of said first signal;

comparing all of said stored unique group addresses with said transmitted signal in response to the generation of said second signal; and,

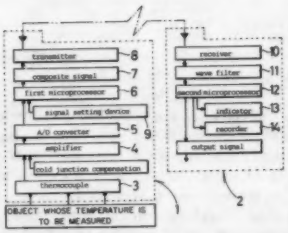
if coincidence is obtained in either of said address comparisons, processing at said terminal unit said data.

4,716,411

THERMOELECTRIC THERMOMETER OF RADIO TRANSMISSION TYPE

Tokio Nakamura, 6-50, Kurakuen Yonban-cho, Nishinomiya-shi, Hyogo-ken, Japan

Filed May 5, 1986, Ser. No. 859,498
Int. Cl.[4] G08C *19/12, 19/16*
U.S. Cl. 340—870.17 **1 Claim**



1. A thermoelectric thermometer for measuring the temperature of a hot environment in the range of about 300° C. to about 1300° C., comprising, in combination:

(a) an elongated housing with a defined front, midportion and rear, a pointed nose section at the front;

(b) an elongated thermocouple (15) with a rear part extending from said nose section into said housing midportion;

(c) a transmitter (17) in said midportion coupled to said thermocouple rear part to receive a signal therefrom;

(d) a sinker (16) disposed between said thermocouple (15) and the transmitter (17), the weight of the sinker being such that it can sink the thermometer in an environment to be measured as to its temperature;

(e) an electric cell power supply (18) coupled to the transmitter to supply power thereto;

(f) a sharp-pointed protective cover (22) covering at least the front of the thermocouple, an insulator (24) disposed around the elongated thermocouple, a flange (20) disposed around the midportion to prevent the thermocouple's transmitter (17) from sinking into the environment to be measured;

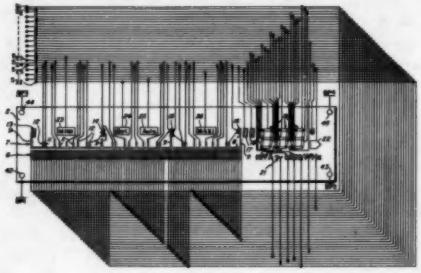
(g) amplifier means (4), analog-to-digital converter means (5) in the transmitter, to amplify the signal received from the thermocouple, with a first microprocessor (6) to convert the digital signal to a data signal; and,

(h) receiver means located some distance away from the transmitter (17), said receiver means being adapted and disposed to receive a transmitted signal from the transmitter and said receiver means including a wave filter (11) to filter the transmitted signal, a second microprocessor (12) to decode the transmitted signal, with a recorder (14) and an indicator (13) to utilize the transmitted signal.

4,716,412
PLANE-STRUCTURE QUANTIFIED ANALOG DISPLAY UNIT AND ANALOG MEASURING DEVICE COMPRISING SUCH A DISPLAY UNIT

Daniel Arnoux; Claude Genter; Christian Anton, and Jacques Forme, all of Paris, France, assignors to Bleris, Paris, France

Filed Jan. 22, 1985, Ser. No. 693,094
Claims priority, application France, Jan. 26, 1984, 84 01177
Int. Cl.[4] G09G *3/18*
U.S. Cl. 340—753 **5 Claims**



1. A quantified analog display device which displays a selected measured quantity in analog form, comprising:

a flat substrate;

a plurality of selectively excitable bar electrodes arranged side by side on one face of the substrate;

a first set of scale electrodes on the one face of the substrate;

a second set of scale electrodes on the one face of the substrate;

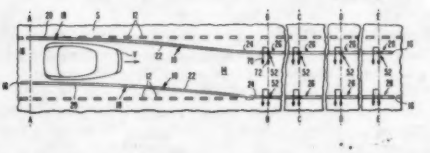
a third set of scale electrodes on the one face of the substrate; and

means for interconnecting said first, second and third sets of scale electrodes to first, second and third terminals, respectively, so as to define a first scale having a first range when said first and second terminals are energized and to define a second scale having a second range when said first and third terminals are energized, said first and second scales each including graduations and associated digits to indicate the range of values being displayed, the digits of the first and second scales having common electrodes and being commonly located adjacent said bar electrodes, whereby said display device can display measured quantities in at least two different ranges of values.

4,716,413
DRUNK DRIVER DETECTION SYSTEM

Ernest Haile, 30 Cadwalder Ter., Trenton, N.J. 08618

Filed Feb. 5, 1986, Ser. No. 826,440
Int. Cl.[4] G08G *1/01*
U.S. Cl. 340—933 **3 Claims**



1. A readily portable apparatus adapted to be laid out upon a road surface as an aid in checking motorists for possible dirver impairment, comprising:

(a) a pair of parallel, identically formed inspection lane boundary strips, each strip having a portion formed with a distinct curvature in the direction of the length of the strip and a fluid pressure chamber having closures at both ends thereof sealing the chamber against leakage, said chamber having a resiliently flexible top wall adapted to be depressed by a vehicle wheel so as to temporarily reduce the volumetric capacity of the chamber and thereby transmit an increased fluid pressure longitudinally of said curved portion to the ends of the chamber, the closure at one end of the chamber being of a material unyielding in the presence of said increased pressure, the closure at the other end of the chamber being formed as a resiliently flexible diaphragm stretched across said other end and adapted to deflect under said increased pressure longitudinally outwardly of the chamber;

(b) means for temporarily locating said strips upon a road surface in a transversely spaced relation selected to form therebetween a traffic lane that has a distinctly curved area defined by the curved portions of the strips whereby when a vehicle rides up upon at least one of the boundary strips the curved traffic lane has not been successfully negotiated, and the presence of an impaired driver is indicated;

(c) first electrical contact means mounted on the diaphragm exteriorly of said chamber so as to shift therewith longitudinally outwardly of the chamber;

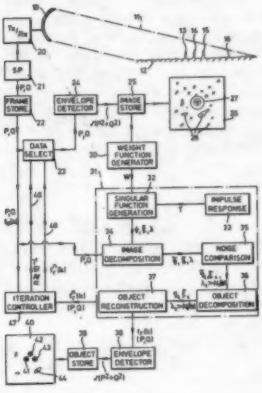
(d) second contact means mounted in the strip exteriorly of said chamber in the path of deflection of the first contact means and engageable by the first contact means on deflection of the diaphragm; and

(e) an alarm circuit actuatable responsive to said engagement of the contact means, to generate a signal indicating the failure of the vehicle to negotiate the traffic lane successfully.

4,716,414
SUPER RESOLUTION IMAGING SYSTEM

Stephen P. Luttrell, Malvern Wells, and Christopher J. Oliver, Malvern, both of England, assignors to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

Filed Apr. 30, 1985, Ser. No. 784,665
Claims priority, application United Kingdom, May 10, 1984, 8411916
Int. Cl.[4] G01S *13/89*
U.S. Cl. 342—179 **8 Claims**



1. An imaging system having a given impulse response and including:

(1) an imaging device employing coherent radiation and arranged to provide complex amplitude image data,

(2) means for generating from image data a weight function appropriate to distinguish weak and strong image features,

(3) means for reconstructing object data from a singular function decomposition of image data on the basis of singular functions derived from the weight function and system impulse response, and

(4) means for generating an image from reconstructed object data.

4,716,415

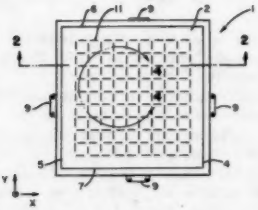
DUAL POLARIZATION FLAT PLATE ANTENNA

Kenneth C. Kelly, 9360 Shoshone Ave., Northridge, Calif. 91325

Filed Dec. 6, 1984, Ser. No. 678,891

Int. Cl.[4] H01Q *13/10*

U.S. Cl. 343—771 **17 Claims**



1. A linearly polarized antenna for producing two coincident broadside beams with said beams having their polarizations orthogonal, comprising:

a top plate;

a bottom plate delimiting with said top plate a cavity in which a first higher order rectangular waveguide mode having a mode number P propagates in a first direction in the cavity, and a second and independent higher order rectangular waveguide mode having a mode number Q propagates in a second direction in the cavity, said first direction being orthogonal to said second direction, said top plate having a first set of radiating slots through it, all slots of said first set being parallel to a Y-axis of a cartesian coordinate system and arranged in P—1 rows of alternatingly staggered parallel radiating slots and Q columns of colinear radiating slots, and a second set of radiating slots, all slots of said second set being parallel to an X-axis of a cartesian coordinate system and arranged in P rows of colinear radiating slots and Q—1 columns of alternately staggered parallel radiating slots, the slots of said first and second sets having respective first and second longitudinal axes, the longitudinal axes of said first and second sets being perpendicular to one another.

4,716,416

ANTENNA DISH REFLECTOR WITH INTEGRAL DECLINATION ADJUSTMENT

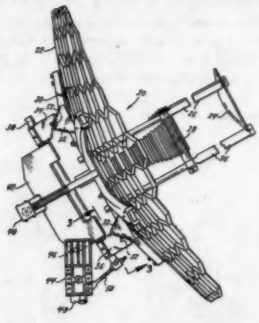
Edward W. Smith, Los Angeles, and Gene Garfinkle, Newport Beach, both of Calif., assignors to Satellite Technology Services, Inc., St. Louis, Mo.

Filed Mar. 28, 1985, Ser. No. 717,506

Int. Cl.[4] H01Q *15/16, 3/02*

U.S. Cl. 343—915 **14 Claims**

1. An antenna for receiving satellite broadcast data, the antenna comprising a main reflector dish, means to rotatably mount said main reflector dish from a support, said support comprising a rod means defining an axis of rotation of said dish to adjust the azimuth thereof, said rotatable mounting means including integral means to adjust the declination of the dish with respect to the support, the declination adjust means comprising an upper and lower pad means rotatably secured to the rod means, an upper and lower surface secured to the dish, and



means to mount said upper and lower surfaces to said upper and lower pads.

4,716,417

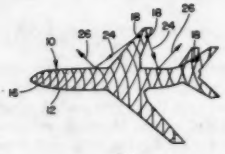
AIRCRAFT SKIN ANTENNA

Alex Grumet, Whitestone, N.Y., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Feb. 13, 1985, Ser. No. 701,141

Int. Cl.[4] H01Q *1/28*

U.S. Cl. 343—708 **50 Claims**



1. A holographic aircraft antenna comprising

a thin layer of strip elements contoured to and secured to the skin of the aircraft, the spacing and width of said thin layer of strip elements are determined by an interference pattern of first and second radio frequency beams recorded on a holographic recording medium thereby forming a hologram to yield the desired radio frequency radiation pattern, said hologram being fabricated such that excitation of said hologram from a radio frequency source mounted to said aircraft will result in the transmission of a radio frequency signal reflected out of said hologram.

4,716,418

APPARATUS AND METHOD FOR EJECTING INK DROPLETS

Joachim Heinzl, Munich, and Guenter Rosenstock, Ottobrunn, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 488,440, Apr. 25, 1983, abandoned. This application Nov. 19, 1984, Ser. No. 673,207

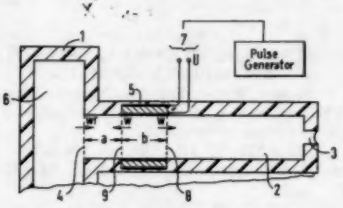
Claims priority, application Fed. Rep. of Germany, May 7, 1982, 3217248

Int. Cl.[4] G01D *15/16*

U.S. Cl. 346—1.1 **20 Claims**

1. Apparatus for ejecting droplets from a fluid-filled channel having a discharge opening comprising, a tubular piezo electric transducer surrounding a part of the length of the said channel, said transducer being adapted to change its internal diameter by expansion and contraction in response to applied

drive pulses, and including means for applying to said transducer a pulse poled opposite to the polarization direction of the transducer in order to cause expansion of the interior diameter of the transducer, said channel having a cross-sectional expansion at its end opposite the discharge opening, said transducer surrounding said channel in the proximity of said cross-sectional expansion, whereby the pressure wave generated by said transducer expansion is reflected at said cross-sectional expansion with the reversal of its polarity, said transducer being



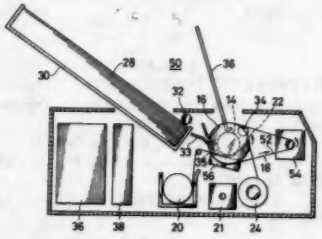
spaced from said cross-sectional expansion by the distance required for a pressure wave to travel from said transducer to said cross-sectional expansion and for a corresponding reflected pressure wave to travel from said cross-sectional expansion to said transducer in approximately the period of said drive pulse, whereby said reflected pressure wave is summed between said transducer and said discharge opening with the generated pressure wave due to the contraction of the transducer, to provide a composite pressure wave for ejecting a single droplet from said fluid-filled channel.

4,716,419

THERMAL TRANSFER PRINTER

Yoji Okazaki, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 756,702, Jul. 19, 1985, abandoned. This application Mar. 30, 1987, Ser. No. 31,208
Claims priority, application Japan, Nov. 12, 1984, 59-238078
Int. Cl.[4] G01D *15/16*
U.S. Cl. 346—76 PH **5 Claims**



1. A thermal transfer printer for thermally recording, with an ink ribbon, information on recording paper wound on a platen, comprising:

a step motor for intermittently turning the plate by means of a timing belt and a timing pulley; and

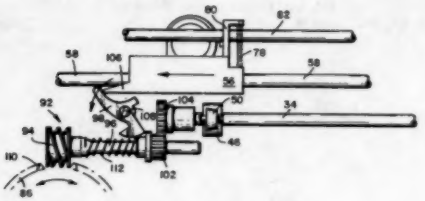
a thermal head for thermally recording information on the recording paper via the ink ribbon, said thermal head having a face positioned adjacent said platen at a location defined by an angle formed by (a) a line originating from an axial center of the platen and extending to a starting point of a tension side of said timing belt on said timing pulley, and (b) a line originating from said axial center and extending to a center of said thermal head face, said angle being between 0° and about 60°.

4,716,420

PEN TURRET ROTATION FOR PLOTTERS

Kevin L. Glassett, San Diego, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Oct. 27, 1986, Ser. No. 923,353
Int. Cl.[4] G01D *9/30, 9/00;* **F16H** *21/44, 1/16*
U.S. Cl. 346—139 R **7 Claims**



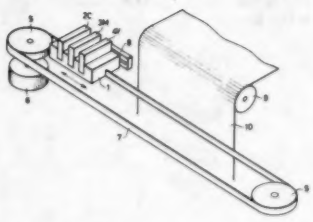
1. In an improved plotter printer for making plots requiring the use of a plurality of pens maintained in a rotatable turret and including (a) means for accepting and moving a printing medium bidirectionally and (b) means for printing information on said medium, said printing means including a carriage assembly comprising means for removing a pen from and replacing a pen on a preselected position on said turret, means for moving said pen bidirectionally orthogonal to the movement of said paper and means for selectively engaging said pen and said medium for printing thereon, the improvement which comprises means for linking rotation of said turret for selecting said pen to said means for moving said medium.

4,716,421

RECORDING APPARATUS

Kunitaka Ozawa, Isehara; Takashi Nakamura, Hiratsuka; Akira Katayama; Katsunori Hatanaka, both of Yokohama; Tetsuzo Mori, Hiratsuka, and Makoto Takaoka, Atsugi, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 14, 1986, Ser. No. 918,715
Claims priority, application Japan, Oct. 18, 1985, 60-230963
Int. Cl.[4] G01D *15/18*
U.S. Cl. 346—140 R **15 Claims**



1. A recording apparatus comprising:

plural recording heads;

a carriage on which said plural recording heads are mounted;

moving means for moving said carriage relative to a recording medium;

detecting means for detecting marks indicating the mounting positions of said recording heads; and

means for generating a value corresponding to the position of each of said recording heads according to the detection output of said detecting means.

4,716,422

MECHANISM FOR RINSING AN INK PRINTING HEAD

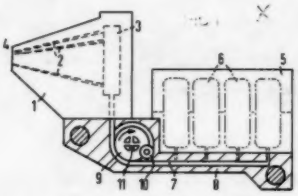
Ernst Goepel, Germering, and Hans Kusmierz, Gilching, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jul. 9, 1986, Ser. No. 883,659

Claims priority, application Fed. Rep. of Germany, Aug. 12, 1985, 3528896

Int. Cl.[4] G01D *15/16;* **B41J** *3/04*

U.S. Cl. 346—140 R **11 Claims**



1. A mechanism for rinsing the ink channels and nozzles of a print head in printer devices upon employment of a hose pump which is firmly connected to the print head and in which the connecting hoses guided over the hose pumps are grasped and pinched by a puck, with the connecting hoses arranged between the ink reservoir and the ink distributing system of the print head, comprising the improvement wherein the connecting hoses are guided over a revolute member having on its outer surface at least one annular groove, the connecting hoses projecting into a sector of the annular groove, whereby at least one section of the pinchable connecting hose lies against a bearing surface of a carrier in the rolling region of the puck, the puck connected to the revolute member being seated rotatable around its longitudinal axes, whereby said puck is situated within the annular groove and a drive element being provided, by means of which the revolute member can be turned.

4,716,423

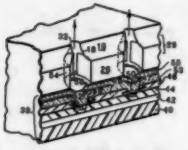
BARRIER LAYER AND ORIFICE PLATE FOR THERMAL INK JET PRINT HEAD ASSEMBLY AND METHOD OF MANUFACTURE

C. S. Chan, and Robert R. Hay, both of Boise, Id., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Division of Ser. No. 801,169, Nov. 22, 1985, abandoned. This application Oct. 3, 1986, Ser. No. 915,290

Int. Cl.[4] G01D *15/18;* **C25D** *1/02;* **G03C** *5/00*

U.S. Cl. 346—140 R **7 Claims**



1. An integrated orifice plate and barrier layer of discontinuous and scalloped wall portions structure for an ink jet printhead manufactured by the process of:

(a) forming a first mask portion having a convergently contoured external surface and a second mask portion having straight vertical walls, and

(b) electroforming a first metal layer around said first mask portion to define an orifice plate layer having one or more convergent orifices, and electroforming a second metal layer around said second mask portion to define a barrier layer of discontinuous and scalloped wall portions having one or more ink reservoir cavities aligned respectively with one or more of said convergent orifices in said orifice plate layer.

4,716,424

PRESSURE-SENSITIVE OR HEAT-SENSITIVE RECORDING MATERIAL

Jean C. Petitpierre, Riehen; Hermann Nachbur, Reinach, and Albert Würmli, Riehen, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed May 13, 1983, Ser. No. 494,467

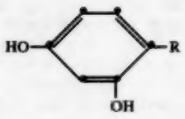
Claims priority, application Switzerland, May 17, 1982, 3052/82

Int. Cl.[4] B41M *5/16, 5/18, 5/22*

U.S. Cl. 503—210 **12 Claims**

1. A pressure- or heat-sensitive recording material, which, in its color reactant system, contains as a color developer for the color former, a substituted resorcinol compound of the formula

(I)



or its corresponding zinc or aluminium salt, in which R is selected from the group consisting of nitro, hydroxyamide, trifluoromethyl, formyl, lower alkanoyl, lower alkenoyl, lower alkanoyloxy, lower-alkoxycarbonyl, benzoyloxy, phenoxycarbonyl, benzyloxycarbonyl, lower-alkylsulfonyl, lower-alkylsulfonyloxy, phenylsulfonyl, phenylsulfonyloxy, lower-alkylphenoxysulfonyl, halogenophenoxysulfonyl, carbamoyl, sulfamoyl, N-(lower)alkylcarbamoyl, N-(lower)alkylsulfamoyl, N-phenylcarbamoyl, N-phenylsulfamoyl, N-hydroxy(lower-)alkylcarbamoyl, N-hydroxy(lower)alkylsulfamoyl, phenylazo and phenylazomethine.

4,716,425

THERAPEUTIC TOMOGRAPHIC SYSTEM

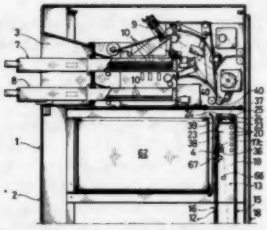
Atsumi Kashiwagi, Nara, Japan, assignor to Fujimoto Photo Industrial Co., Ltd., Osaka, Japan

Filed Dec. 11, 1986, Ser. No. 940,461

Claims priority, application Japan, May 29, 1986, 61-124945; May 29, 1986, 61-124946

Int. Cl.[4] G03B *29/00, 27/60*

U.S. Cl. 354—76 **5 Claims**



1. A therapeutic tomographic system for projecting on a film an image appearing on a monitor television, comprising,

a low pressure box whose interior is held at a negative pressure and which is provided with a vertical receiving surface having a large number of vent holes, and

a feed belt interposed between said film and said receiving surface, which directly receives said film owing to adhesive power of said low pressure box, to be integrated therewith, and which in that state, reciprocally moves in vertical direction.

4,716,426

METHOD OF AND APPARATUS FOR PHOTOGRAPHING MEDICAL IMAGE

Hisashi Endo, Tokyo, Japan, assignor to Yokogawa Medical Systems, Limited, Tokyo, Japan

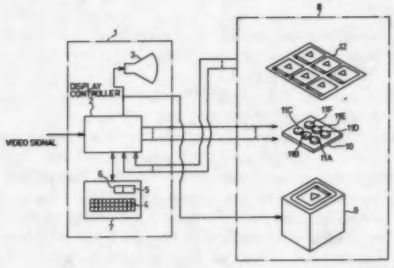
PCT No. PCT/JP86/00277, § 371 Date Jan. 9, 1987, § 102(e) Date Jan. 9, 1987, PCT Pub. No. WO86/07168, PCT Pub. Date Dec. 4, 1986

PCT Filed May 29, 1986, Ser. No. 10,276

Claims priority, application Japan, May 30, 1985, 60-116975

Int. Cl.[4] G03B *29/00*

U.S. Cl. 354—76 **2 Claims**



1. A method of photographing a medical image comprising the steps of:

displaying on a display a registration frame for registering information for specifying a plurality of images to be successively photographed;

registering said information for specifying said plurality of images through said registration frame on said display;

supplying video signals of said plurality of images to a multi format camera successively with reference to the registered information; and

photographing the plurality of images in succession which correspond to the supplied video signals by said multi format camera.

4,716,427

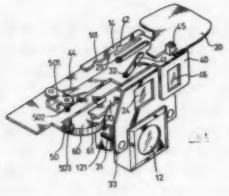
CAMERA MEANS FOR REGULATING THE EXPOSURE AREA OF A FRAME OF FILM

Shiow-Feng Shyu, P.O. Box 10780, Taipei, Taiwan

Filed Mar. 17, 1986, Ser. No. 840,492

Int. Cl.[4] G03B *1/00, 13/02, 17/38*

U.S. Cl. 354—159 **13 Claims**



1. A camera which can regulate the exposure area of a frame of film comprising:

(a) a body;

(b) a film advance wheel for turning the film take-up spool around and for returning a shutter striking plate to its original position;

(c) a regulating plate;

(d) a view shield device arranged to be actuated by the regulating plate and movable between a first position in which it is substantially clear of the viewfinder and a second position in which it is effective to shield the viewfinder to reduce the viewing area to approximately half the total width thereof;

(e) means for guiding movement of the regulating plate;

(f) at least two opaque movable blades arranged to be driven by the regulating plate to shield an exposure window of the camera from the sides of the window such that the width of the exposure window is reduced to approximately one half of the total width;

(g) a clutch device actuable by the regulating plate to control the film advance wheel to rotate through one cycle or one half on each operation of the shutter mechanism of the camera;

(h) an operating member accessible from outside the camera, said operating member being arranged to move the regulating member between two positions and the regulating member being arranged, when being moved from a first to a second position, to move the view shield device to the second position, to move the opaque movable blades to shield half of the width of the exposure window and to move control means for the film advance wheel so that said wheel can rotate through only one half cycle after each shutter operation such that the length of the film advanced is reduced to one half of the normal length advanced; when being moved from the second position back to the first position, to move the view shield device to the first position, to move the opaque movable blades to a position in which they no longer obstruct the exposure window and to move said control means for the film advance wheel so that said wheel can rotate through one full cycle after each shutter operation so that the length of film advanced corresponds to a full frame of the exposure window.

4,716,428

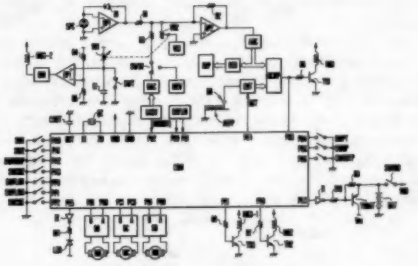
AUTOMATIC FILM LOADING DEVICE FOR CAMERA

Masaharu Kawamura, Kawasaki; Yoshihito Harada, Yokohama; Ryuichi Kobayashi, Kawasaki; Masayuki Suzuki, Yokohama; Tsunemasa Ohara, and Yoichi Tosaka, both of Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 16, 1986, Ser. No. 942,387

Int. Cl.[4] G03B *1/12*

U.S. Cl. 354—173.11 **6 Claims**



1. A camera having an automatic loading device which includes a first film winding detection means for generating a one-frame detection signal by detecting a film winding time interval for every frame portion of the film and is arranged to continuously blank feed a plurality of frame portions of the

film on the basis of said one-frame detection signal when the camera is loaded with said film, comprising:

(a) second film winding detection means arranged to detect a film winding extent shorter than one frame and to generate a plurality of film movement detection signals every time one frame portion of said film is wound up;

(b) third film winding detection means for detecting from the number of said film movement detection signals of said second detection means the amount of film blank fed during a period of time between the start of blank film feeding and generation of the one-frame detection signal by said first film winding detection means; and

(c) control means for variably controlling the number of blank fed frame portions of said film on the basis of the result of detection made by said third film winding detection means.

4,716,429

DISPLAY APPARATUS FOR SINGLE-LENS REFLEX CAMERA

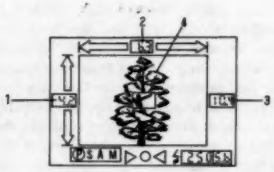
Isao Misawa, 6-Go, Wakame-sou, 1-31-12 Higashi-nogawa, Komae-Shi, Tokyo, Japan

Filed Dec. 22, 1986, Ser. No. 945,370

Claims priority, application Japan, Dec. 23, 1985, 60-196563[U]

Int. Cl.⁴ G03B 3/10, 17/20

U.S. Cl. 354—409 **10 Claims**



1. In a single lens reflex camera of the type having a camera body removably mountable to an interchangeable lens and comprising means for effecting autofocusing of said mounted lens, said camera body comprising a viewfinder picture display means for displaying an in-focus picture of a subject to be photographed; the improvement comprising means for detecting and displaying the distance to said subject from said camera in said viewfinder picture display means adjacent said in-focus picture, and means for detecting a focal distance of said interchangeable lens removably mounted to said camera body and for displaying corresponding vertical and horizontal dimensions of said subject based on said detected lens focal distance, said subject vertical and horizontal dimension display further being provided in said viewfinder picture display means adjacent said in-focus picture, said subject vertical and horizontal dimension display providing means comprising means for obtaining a field angle based on said detected lens focal distance and for calculating a relationship in size between the camera picture size and said subject; whereby the vertical and horizontal dimensions of an in-focus subject and the distance to said subject may be displayed in the camera viewfinder along with the in-focus picture of the subject in an improved single lens reflex camera display apparatus.

4,716,430

PULSE PROXIMITY DETECTION

Norman L. Stauffer, Englewood, Colo., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Nov. 4, 1986, Ser. No. 926,756

Int. Cl.⁴ G03B 3/00; G01C 3/08

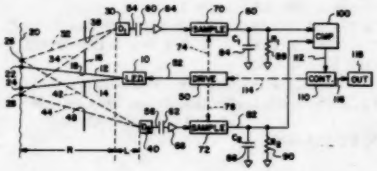
U.S. Cl. 354—403 **27 Claims**

1. Range determining apparatus comprising:

energy producing means for directing a pulse of energy to a remote surface to form a spot of energy thereon;

first energy responsive means positioned an unknown distance from the surface to receive energy reflected from at least the entire spot and to produce a first output which increases to a first value indicative of the energy received by the first energy responsive means during a first time period;

second energy responsive means positioned a predetermined optical distance further from the surface than the first energy responsive means to receive energy reflected from at least the entire spot and to produce a second output



which increases to a second value indicative of the energy received by the second energy responsive means during the first time period;

first decay means connected to the first energy responsive means to receive the first output;

second decay means connected to the second energy responsive means to receive the second output; and

comparing means connected to the first and second decay means and operable to produce a third output indicative of a second time period which is a function of the relative time needed for the first and second outputs to decay to an equal value, the second time period being a function of the unknown distance.

4,716,431

OPTICAL SYSTEM FOR USE IN FOCUS DETECTING APPARATUS

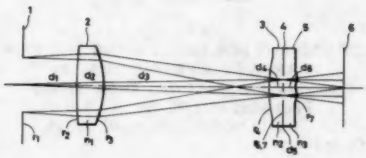
Osamu Shindo, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 25, 1986, Ser. No. 889,535

Claims priority, application Japan, Jul. 26, 1986, 60-166580

Int. Cl.⁴ G03B 3/00

U.S. Cl. 354—407 **1 Claim**



1. In an optical system for use in a focus detecting apparatus which comprises a condenser lens disposed at a film equivalent surface or in the vicinity thereof and a pair of splitting optical elements which are disposed behind said condenser lens in a manner symmetrical with respect to the meridional plane of said condenser lens, the focus position being detected by sensing a relative positional mismatch between the images of the object refocused by the respective splitting optical elements, the improvement wherein the rear surface of said condenser lens is an ellipsoidal surface which satisfies the relation $-1<k<0$ when it is expressed by the formula for a quadratic surface:

$$x = \frac{ch^2}{1 + \sqrt{1 - (k+1)c^2h^2}}$$

and wherein an auxiliary lens which is coaxial with said condenser lens is disposed just in front of said splitting optical elements.

4,716,432

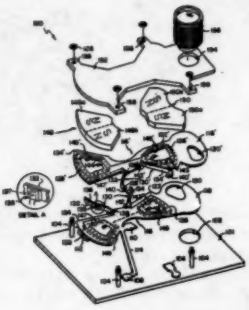
EXPOSURE CONTROL APPARATUS

Thomas M. Stephany, Churchville, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 24, 1986, Ser. No. 855,289

Int. Cl.[4] G03B 9/08, 9/14

U.S. Cl. 354—446 **7 Claims**



1. Exposure control apparatus for regulating the amount of light admitted to a selected area, said apparatus comprising:

light limiting means movable from a rest position to admit light to said area;

means for moving said light limiting means;

means for urging said light limiting means toward said rest position;

means for providing a first output indicative of ambient light;

means for sensing a change in said urging means which is indicative of an instantaneous position of said light limiting means and for producing a second output proportional to said change; and

means for actuating said moving means to admit a predetermined amount of light to said area in response to said first and second outputs.

4,716,433

BATTERY CHECKING CIRCUIT

Kiyoshi Alyfuku, Kanagawa, Japan, assignor to Canon Kabushiki Kaisha

Filed Apr. 26, 1985, Ser. No. 727,587

Claims priority, application Japan, Apr. 28, 1984, 59-86884; Apr. 28, 1984, 59-86885; Sep. 10, 1984, 59-189054; Mar. 6, 1985, 60-44001

Int. Cl.[4] G03B 17/18

U.S. Cl. 354—468 **38 Claims**

1. A battery checking circuit for a camera comprising:

(a) a first pulse generating circuit for producing a number of pulses for each camera operation;

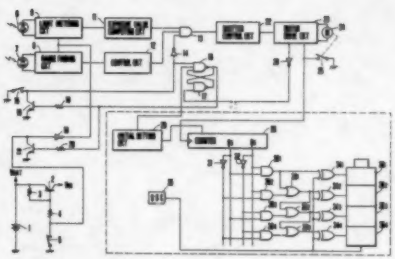
(b) a circuit for an accessory operation associated with the camera;

(c) a second pulse generating circuit for producing a number of pulses for each accessory operation;

(d) a counter for counting and providing an output of the sum of the pulses produced from said first and said second pulse generating circuits;

(e) display means for displaying the remaining amount of energy of a battery, said display means having a plurality of display areas arranged side by side; and

(f) control means for controlling the operation of a plurality of display elements for said areas in accordance with the



output sum of said counter, said control means causing said plurality of display areas to change their appearance from one side to another successively depending on the number of pulses counted so that the remaining amount of energy of the battery is made recognizable.

4,716,434

FOCUS CONDITION DETECTING DEVICE

Nobuyuki Taniguchi, Nishinomiya; Tokuji Ishida, Daito; Masataka Hamada, Minamikawachi; Toshihiko Karasaki, and Toshio Norita, both of Sakai, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Dec. 23, 1986, Ser. No. 945,879

Claims priority, application Japan, Dec. 23, 1985, 60-291149

Int. Cl.[4] G03B 3/00

U.S. Cl. 354—408 **2 Claims**

1. A focus condition detecting device, comprising:

an objective lens;

first and second light intensity distribution signal generating means including first and second sensor arrays for receiving light having passed through different areas of the exit pupil of said objective lens and generating first and second light intensity distribution signals which represent light intensity respectively;

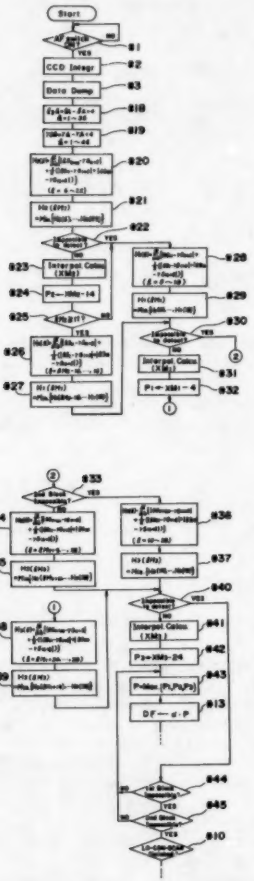
signal dividing means for dividing said first light intensity distribution signal into a plurality of blocks;

calculation means for shifting each of the portions of said first light intensity distribution signal belonging to said respective blocks relative to said second light intensity distribution signal by sequentially changing the amount of shift to calculate correlations therebetween and thereby to find the amount of shift providing the highest correlation with respect to each of said blocks;

focus condition signal generating means for generating a focus condition signal representing the focus condition of said objective lens in accordance with the amount of shift found to provide the highest correlation through each correlation calculation; and

control means for controlling said calculation means in accordance with the amount of shift found through the correlation calculation with use of the portion of said first light intensity distribution signal belonging to one of said

blocks, so as to restrict the shift range for the succeeding correlation calculation with use of the portion of said first



light intensity distribution signal belonging to another one of said blocks.

4,716,435

HEAT AND PRESSURE ROLL FUSER AND ROLL ENGAGING MECHANISM THEREFOR

Jack O. Wilson, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Nov. 29, 1985, Ser. No. 802,890

Int. Cl.[4] G03G *15/20*

U.S. Cl. 355—3 FU **9 Claims**

1. Latch mechanism for a heat and pressure roll fuser, said apparatus comprising:

a pair of pivotally supported support arms for supporting one of a pair of rolls forming said fuser, said one of a pair of rolls including shaft members;

means for supporting another roll of said fuser so that it is disposed substantially above said one of a pair of rolls;

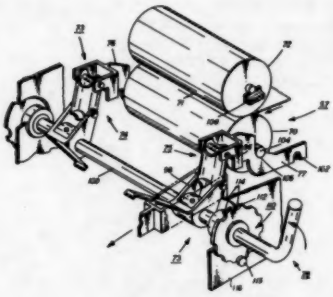
an actuator member operably supported for cooperation with said pair of support arms;

means interconnecting said support arms to said actuator member and operative in at least one position to apply a force sufficient to force said one roll into pressure engagement with said another roll upon actuation of said actuator member;

said pair of support arms, interconnecting means and said actuator member comprising the sole means for operatively supporting said one of a pair of rolls;

said support arms each being provided with a recess for receiving and captivating said shaft members for movement with said support arms;

said interconnecting means comprising a pair of over-center toggle structures wherein each of said toggle structures



comprises a first toggle link fixedly secured to said actuator member and a second toggle link pivotally secure to one of said support arms;

a compression spring in said second toggle link for effecting pressure engagement of said rolls when said latch mechanism is actuated; and

a pair of washers for retaining said compression spring and a pair of shafts for retaining said washers in said second toggle link, said shafts being provide with a notched area for receiving at least a part of said washer whereby said shafts are captivated in said second toggle link.

4,716,436

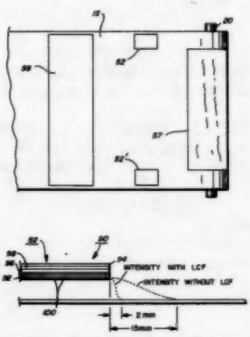
CHARGE ERASE DEVICE WITH FLARE LIGHT CONTROL

Joseph H. Lang, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Feb. 26, 1986, Ser. No. 833,313

Int. Cl.[4] G03G *15/052, 21/00*

U.S. Cl. 355—3 CH **3 Claims**



1. An electrophotographic reproduction machine wherein a photoconductive surface is uniformly charged by a corona generating means and a latent image of an original document is subsequently formed on said photoconductive surface by an optical exposure system, said machine including at least one

charge erase device for dissipating the charge on selected areas of the photoconductive surface exclusive of the area of said latent image, said charge erase device comprising, in combination,

an electroluminescent display panel

adapted to provide a light output from at least one surface thereof, and

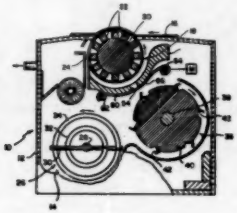
a light control film optically coupled to said display panel, said film adapted to direct said light output onto said photoconductive surface preferentially whereby flare light intrusion into the latent image area is minimized.

4,716,437

DEVELOPMENT STATION HAVING APERTURED THIN FILM FOR CONTROLLING THE FLOW OF DEVELOPER MATERIAL

Bruce D. MacLellan, Ontario, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Nov. 19, 1986, Ser. No. 932,415
Int. Cl.[4] G03G *15/00, 15/09*
U.S. Cl. 355—3 DD **5 Claims**



1. In electrographic apparatus having a development station with a magnetic brush for applying developer material to a photoconductor, means for feeding developer material to the magnetic brush, and means defining an opening between the magnetic brush and the feeding means through which developer material passes as it is fed to the brush, the improvement comprising:

means for controlling the flow of developer material from the feeding means to the magnetic brush through the opening, the controlling means comprising a thin, flexible member positioned between the feeding means and the opening, the member having a plurality of apertures through which developer material can flow, and means for moving member between (1) a first position wherein the apertures are aligned with the opening so that developer material from the feeding means can pass through the apertures and be delivered to the magnetic brush and (2) a second position wherein the apertures are displaced from the opening to block the flow of developer material from the feeding means through the opening.

4,716,438

HIGH SPEED ELECTRONIC REPROGRAPHIC/PRINTING MACHINE

Barbara L. Farrell, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.

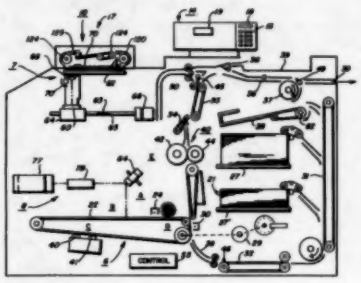
Filed Nov. 17, 1986, Ser. No. 931,600
Int. Cl.[4] G03G *15/00*
U.S. Cl. 355—6 **5 Claims**

1. A method of operating an electronic reprographics/printing machine having a scanner for scanning documents at least one of which contains control instructions for operating the machine in the form of a coded image, the remainder of the documents bearing images to be converted into image signals for processing by said machine in accordance with said control instructions, comprising the steps of:

(a) scanning each of said documents in succession;

(b) tolling a preset time interval when scanning each of said documents while looking for said coded image;

(c) concluding no coded image is present on failure to detect said coded image within said time interval but continuing scanning of said document to convert the image thereon to image signals for processing by said machine;



(d) where a coded image is detected, decoding said coded image to provide control instructions for operating said machine; and

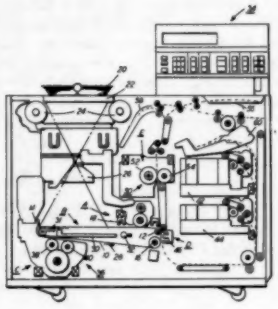
(e) terminating scanning of the document bearing said coded image prematurely on detection of the end of said coded image whereby to enhance scanner throughput rate.

4,716,439

HALF-MODE COPYING MACHINE

Thomas Acquaviva, Penfield, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Apr. 21, 1986, Ser. No. 854,214
Int. Cl.[4] G03G *15/04*
U.S. Cl. 355—7 **7 Claims**



1. An electrophotographic printing machine, including:

means for supporting a first document and a second document;

a photoconductive member;

means for charging at least a portion of said photoconductive member;

means for flash illuminating the first document and the second document supported by said supporting means;

optical means associated with said flash illuminating means for projecting a first light image of the first document and the second document onto the charged portion of said photoconductive member to record a first electrostatic latent image of the first document and the second document on said photoconductive member; and

means for erasing a portion of the first electrostatic latent image recorded on said photoconductive member corresponding to the first document.

4,716,440
POSITIONING DEVICE FOR SHEET ON EXPOSURE PLATEN OF A COPYING MACHINE

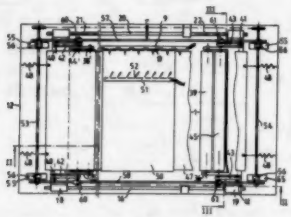
Franciscus A. C. M. Couwenberg, Veldhoven; Cornelis J. Groenenberg, and Antonius C. S. Wetjens, both of Venlo, all of Netherlands, assignors to Oce-Nederland B.V., Venlo, Netherlands

Filed Nov. 5, 1986, Ser. No. 927,645

Claims priority, application Netherlands, Nov. 6, 1985, 8503038

Int. Cl.⁴ G03G *15/00*

U.S. Cl. 355—14 SH **6 Claims**



1. A device for positioning an original in sheet form on the exposure platen of a copying machine, comprising:

a. a frame having at least one abutment means adaptable for movement into an operative position in contact with said exposure platen;

b. means for feeding said original sheet onto said platen and against the abutment means;

c. a first pair of first and second rollers disposed with their axes parallel and adjacent to said abutment means, said rollers being displaceable with said abutment means along said platen;

d. means for displacing said first roller towards the platen; and

e. a pressure member consisting of a flexible belt having opposite ends which are secured to said frame and being entrained between said first roller and said platen and about said first roller and in the opposite direction being entrained about said second roller and over the abutment towards the frame whereby displacement of first roller towards the platen presses said pressure member against said sheet.

4,716,441
LIGHT EXPOSURE APPARATUS

Kazufumi Ogawa, Hirakata, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Jul. 16, 1986, Ser. No. 886,662

Claims priority, application Japan, Jul. 19, 1985, 60-160508

Int. Cl.⁴ G03B *27/52*

U.S. Cl. 355—30 **5 Claims**

1. A light exposure apparatus comprising:

an exposure light source for generating light of a wavelength in the far ultraviolet wavelength region;

a light exposure optical system for receiving and passing light from said light source therethrough along an exposure light path;

an alignment optical system operatively associated with said light exposure optical system for aligning said light exposure optical system and including means for directing light along an alignment light path;

a box in which said exposure light path and said alignment light path are at least in part disposed;

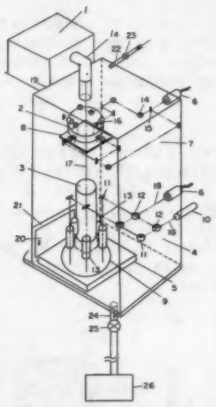
an air inlet means in said box for introducing air into the inside of said box;

first means for opening and shutting said air inlet means;

an air outlet means in said box for exhausting air from the inside of said box;

second means for opening and shutting said air outlet means; and

exhaust means coupled to said air outlet means through said second means for exhausting the interior of said box to a subatmospheric pressure;



whereby said air inlet means can be closed and said air outlet means opened and said exhaust means can be operated to exhaust air from the interior of said box so that the inside of said box is at a subatmospheric pressure.

4,716,442
EXPOSURE DEVICE AND EXPOSURE CONTROL METHOD

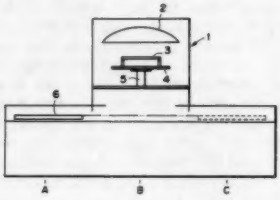
Yoshio Yazaki, Chofu, Japan, assignor to ORC Manufacturing Co., Ltd., Tokyo, Japan

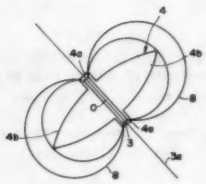
Filed Feb. 24, 1986, Ser. No. 832,436

Claims priority, application Japan, Feb. 22, 1985, 60-34162

Int. Cl.⁴ G03B *27/72*

U.S. Cl. 355—67 **4 Claims**





1. An exposure device comprising

an exposure stand upon which is mounted an object to be exposed and which is reciprocably movable across an illuminated surface defined by an exposure light source;

said exposure light source comprising a reflecting mirror such as a parabolic reflecting mirror or a deformed ellipti-

cal reflecting mirror, a line light source disposed in parallel with said illuminated surface and extending through the focal point of said reflecting mirror; an optical shielding plate formed integrally with said line light source and interposed between said line light source and said illuminated surface; said optical shielding plate having a predetermined configuration for interrupting light rays emitted from said line light source directly toward said illuminated surface and also interrupting reflected rays directed at greater than the desired angle of incidence;

an assembly of said line light source and said optical shielding plate being rotatable relative to said illuminated surface; and

the configuration of said optical shielding plate being so defined that the integrated quantities of light incident at every point on the surface of said object to be exposed become substantially equal to each other.

4,716,443

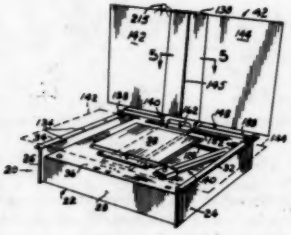
PHOTOGRAPHIC IMAGE PRECISION REPROPORTIONING SYSTEM

Thomas L. Byers, P.O. Box 26624, Oklahoma City, Okla. 73126

Continuation-in-part of Ser. No. 676,336, Nov. 29, 1984, Pat. No. 4,607,952. This application Aug. 14, 1986, Ser. No. 896,556

Int. Cl.[4] G03B *27/10, 27/68*

U.S. Cl. 355—84 **12 Claims**



1. A photographic image reproportioning apparatus, comprising:

a base having opposing ends, opposing sides and a planar top;

transparent carriage means overlying said top for supporting a photographic film having an image thereon;

platen means interposed between said top and said carriage means for supporting a photosensitive sheet in printing contact with the photographic film;

means mounting said platen means on said top for rectilinear movement between the base ends when in a first position and between the base sides in a second position and normally biasing said platen means in one direction;

manually adjustable calibration bar means contacting and moving said platen means a predetermined distance opposite said one direction when in said second position;

light impervious mask means including an opaque sheet overlying said carriage means and having a photo-light passing slit extending transversely or in the direction of platen means travel for the passing of film exposure light therethrough;

motor driven means for simultaneously or separately moving said mask means and said calibration bar means in the same or opposite directions along the platen means travel path; and,

template means interposed between the platen means and the motor driven means for predetermined movement of the platen means against or with its bias in said one direction when in said first position.

4,716,444

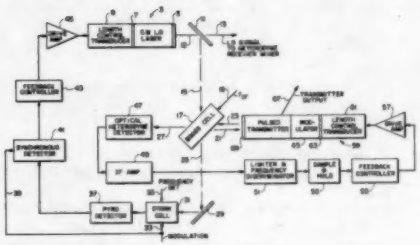
OPTICAL RADAR TRANSCEIVER CONTROL APPARATUS

Robert J. Mongeon, S. Windsor; Robert J. Wayne, Manchester, and Robert W. Henschke, E. Hampton, all of Conn., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Aug. 1, 1985, Ser. No. 761,257

Int. Cl.[4] G01C *3/08*

U.S. Cl. 356—05 **2 Claims**



1. Optical radar transceiver control apparatus of the heterodyne type comprising

a pulsed transmitted laser, said transmitter laser having an intracavity modulator for pulse modulation thereof;

a continuous wave local oscillator laser, said local oscillator laser having a lower power output than said transmitter laser and operating on substantially the same power curve as said transmitter laser;

an acousto-optic Bragg cell having a Bragg angle input, a non-Bragg angle input, a transducer input, a first output at which a zero order output signal appears which has the same frequency as the signal applied to said Bragg angle input, a second output at which a first order output signal appears which has a frequency equal to the sum of the frequencies of signals applied to said Bragg angle input and said transducer input, and a third output at which a signal appears which has zero and first order components of a signal applied to said non-Bragg angle input;

means for coupling said Bragg cell Bragg angle input to receive at least a portion of the output beam from said local oscillator laser;

means for coupling said Bragg cell non-Bragg angle input to receive at least a portion of the output beam from said transmitter laser;

means for coupling said Bragg cell transducer input to a RF signal having a frequency equal to the desired intermediate frequency at which the heterodyne apparatus is to operate;

means for coupling said Bragg cell first output to first frequency control means for stabilizing the optical output frequency of said local oscillator laser at a frequency which differs from the line center frequency of said laser power curve by an amount equal to said desired intermediate frequency;

means for coupling said Bragg cell second output to said transmitter laser for injection control of said transmitter laser by said Bragg cell first order output signal; and

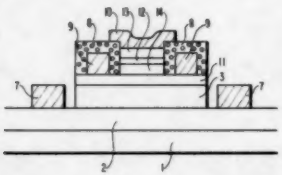
means for coupling said Bragg cell third output to second frequency control means for controlling the length of the cavity of said transmitter laser to cause said transmitter laser to operate at the line center frequency of said laser power curve.

4,716,445

HETEROJUNCTION BIPOLAR TRANSISTOR HAVING A BASE REGION OF GERMANIUM

Jun'ichi Sone, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Jan. 20, 1987, Ser. No. 4,931
Claims priority, application Japan, Jan. 17, 1986, 61-8587
Int. Cl.[4] H01L *29/161, 29/72, 29/20*
U.S. Cl. 357—16 **13 Claims**



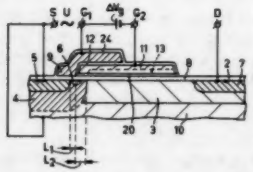
1. A heterojunction transistor comprising;
a collector region having a GaAs layer of one conductivity type;
a base region having a germanium layer of the other conductivity type formed on said GaAs layer; and
an emitter region having a mixed crystal layer of silicon and germanium, said mixed crystal layer having said one conductivity type and being formed on said germanium layer.

4,716,446

INSULATED DUAL GATE FIELD EFFECT TRANSISTOR

Leonard J. M. Esser; Petrus J. A. M. Van de Wiel; Leonardus A. Daverveld, and Johannes A. A. Van Gils, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 558,229, Dec. 5, 1983, abandoned. This application Jun. 9, 1986, Ser. No. 872,630
Claims priority, application Netherlands, Dec. 16, 1982, 8204855
Int. Cl.[4] H01L *29/78*
U.S. Cl. 357—23.14 **8 Claims**



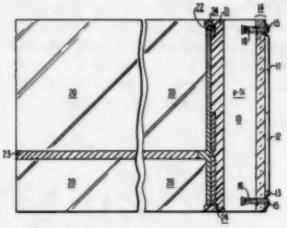
1. A semiconductor device having a semiconductor body comprising at least an insulated gate field effect transistor having a surface-adjacent first region, a surface-adjacent channel region of a first conductivity type surrounded at least laterally by the first region, said first region being of a selected conductivity type, a source zone of the second opposite conductivity type adjoining the surface and surrounded within the semiconductor body at least in part by the channel region, a surface-adjacent channel zone between the source zone and the first region and forming part of the channel region, a drain zone of the second conductivity type which is separated by a part of the first region, referred to as the drift region, from the channel region and has a higher doping concentration than that of the first region, an electrically insulating layer located at least on the channel zone and a gate electrode located on the insulating layer above the channel zone, characterized in that a second gate electrode located on the drain side of the channel zone and separated from the first gate electrode is present on the insulating layer above the channel zone adjacent the first gate electrode located on the source side of the channel zone, whereby in the direction from the source zone to the drain zone, the length L_2 of the part of the second gate electrode located above the channel zone and separated therefrom only by said insulating layer is larger than the length L_1 of the part of the first gate electrode located above the channel zone and separated therefrom only by said insulating layer, said device further comprising means for applying a potential difference between said first and second gate electrodes during operation.

4,716,447

INTERRUPTING CHARGE INTEGRATION IN SEMICONDUCTOR IMAGERS EXPOSED TO RADIANT ENERGY

Eugene D. Savoye, Lancaster, Pa., assignor to RCA Corporation, Princeton, N.J.

Continuation of Ser. No. 778,758, Sep. 20, 1985, abandoned. This application Sep. 8, 1986, Ser. No. 904,805
Int. Cl.[4] H01L *29/78, 27/14, 31/00, 27/12*
U.S. Cl. 357—24 **12 Claims**



1. In combination:
a semiconductor substrate uniformly thin in its entirety and having opposed first and second surfaces;
means for generating charge carriers in the bulk of said substrate;
means for inducing an array of depletion regions in a portion of the first surface of said substrate, said depletion regions having a tendency to collect said charge carriers;
a backing plate of glass which is relatively thick as compared to said uniformly thin semiconductor substrate so as to provide structural support to said thin semiconductor substrate and including a vapor-deposited and photolithographically-shaped electrode structure in direct contact with a first surface thereof without any layer of cement in contact with said electrode structure on the side of said electrode structure facing said backing plate;
a layer of insulating cement of a material different than glass for cementing said first surface of the thick backing plate with electrode structure already in place thereon to the second surface of said semiconductor substrate, with an alignment such that said electrode structure opposes said array of depletion regions; and
means for applying potentials between said semiconductor substrate and said electrode structure for selectively suppressing said tendency.

4,716,448

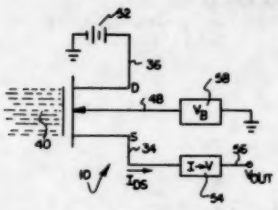
CHEMFET OPERATION WITHOUT A REFERENCE ELECTRODE

Kevin A. Kelly, 858 Kinnear Rd., Apt. #213, Columbus, Ohio 43212

Filed Sep. 3, 1985, Ser. No. 771,974
Int. Cl.[4] H01L *29/66*
U.S. Cl. 357—25 **24 Claims**

1. In combination, a chemically sensitive field effect transducer having a gate region adapted to interface with a substance so as to generate an electrochemical interfacial potential in response to a chemical property of the substance and further

having source, drain, and substrate regions, at least a portion of said substrate region being between the source and the drain,



first means for applying a potential between the source and drain, and second means for applying a time-variant potential to the substrate.

4,716,449

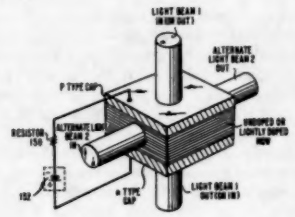
NONLINEAR AND BISTABLE OPTICAL DEVICE

David A. B. Miller, Fairhaven, N.J., assignor to American Telephone and Telegraph Company AT&T Bell Laboratories, Murray Hill, N.J.

Continuation of Ser. No. 785,546, Oct. 8, 1985, abandoned, which is a continuation-in-part of Ser. No. 589,556, Mar. 14, 1984, Pat. No. 4,546,244. This application Jan. 14, 1987, Ser. No. 6,327

Int. Cl.[4] H01L *27/14*

U.S. Cl. 357—30 **7 Claims**


LIGHT BEAM 1 (MOD OUT)
ALTERNATE LIGHT BEAM 2 OUT
P TYPE GAP
ALTERNATE LIGHT BEAM 2 IN
UNDOPED OR LIGHTLY DOPED REGION
LIGHT BEAM 1 (MOD IN)
n TYPE GAP

1. An optical device, comprising:

first means, including a first surface, capable of absorbing electromagnetic radiation incident on said first surface, the absorption and/or refractive index of said first means being alterable by applying a voltage across said first means and/or through alterations in said applied voltage; and

second means for producing a voltage across said first means, said voltage being alterable in response to electromagnetic radiation incident on, and absorbed by, said second means, Characterized In That

said first means further includes a quantum well region, and said second means includes at least a first component integral with said first means and at least a second component overlying a portion, but less than all, of said first surface.

4,716,450

SEMICONDUCTOR INTEGRATED CIRCUIT HAVING COMPLEMENTARY FIELD EFFECT TRANSISTORS

Ryuichi Hashishita, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Jun. 26, 1985, Ser. No. 748,840

Claims priority, application Japan, Jun. 26, 1984, 59-131474

Int. Cl.[4] H01L *27/02*

U.S. Cl. 357—42 **9 Claims**

1. A semiconductor integrated circuit comprising

a semiconductor substrate;

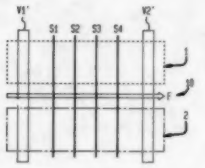
a first transistor forming region of a first conductivity type elongated in a first direction;

a second transistor forming region of a second conductivity type elongated in said first direction, said first and second transistor forming regions provided being adjacent and parallel to each other;

a plurality of first field effect transistors formed on said first transistor forming region and distributed in said first direction over substantially an entire area of said first transistor forming region;

a plurality of second field effect transistors formed on said second transistor forming region and distributed in said first direction over substantially an entire area of said second transistor forming region;

a plurality of first wirings formed on said first and second transistor forming regions, at least a portion of said first wirings extending in said first direction on said first and



second transistor forming regions, gates of said first and second transistors being formed with said first wirings;

first and second power supply wirings extending in a second direction perpendicular to said first direction, each of said first and second power supply wirings passing over each of said first and second transistor forming regions;

a plurality of signal wirings extending in said second direction and passing over each of said first and second transistor forming regions, said first and second power supply wirings and said signal wirings being nonsuperposed and formed on the same wiring layer level;

means for electrically connecting said first and second field effect transistors to said signal wirings;

means for electrically connecting said first power supply wiring to a part of said first transistor forming region; and

means for electrically connecting said second power supply wiring to a part of said second transistor forming region.

4,716,451

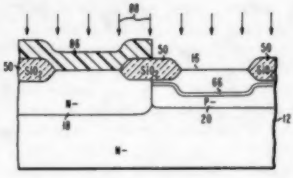
SEMICONDUCTOR DEVICE WITH INTERNAL GETTERING REGION

Sheng T. Hsu, Lawrenceville, and Doris W. Flatley, Belle Mead, both of N.J., assignors to RCA Corporation, Princeton, N.J.

Filed Dec. 10, 1982, Ser. No. 448,724

Int. Cl.[4] H01L *27/04*

U.S. Cl. 357—42 **7 Claims**



1. A semiconductor device comprising:

a substrate of single crystalline silicon having opposed surfaces,

the active region of at least one semiconductor element on said substrate adjacent one of said surfaces, and

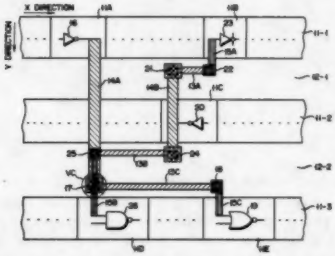
means for gettering including a thin gettering region of a

substantially unannealed gettering material in said substrate spaced from both said surfaces and extending adjacent but spaced from the active regions of at least one of said semiconductor elements.

4,716,452
SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE CONSTRUCTED BY POLYCELL TECHNIQUE

Hitoshi Kondoh, and Akihiro Sueda, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Nov. 8, 1985, Ser. No. 796,422
Claims priority, application Japan, Nov. 9, 1984, 59-235192
Int. Cl.[4] H01L *23/48, 27/10, 27/02*
U.S. Cl. 357—68 **24 Claims**



1. A semiconductor IC device made by the polycell technique, comprising:

a semiconductor substrate;

various functional circuits formed in one major surface of said semiconductor substrate;

a plurality of cell arrays each constituted by unit cells having said functional circuits;

a wiring region formed between any two adjacent cell arrays;

a first insulating layer formed on said semiconductor substrate;

a polysilicon wiring layer formed on said first insulating layer, embedded in the corresponding unit cell, positioned in said wiring region, extending at right angles to said cell arrays and connected at one end to one of the input terminals of the corresponding unit cell;

a second insulating layer formed on said first insulating layer and said polysilicon wiring layers;

a first metal wiring layer formed on that portion of said second insulating layer which is positioned in said wiring region;

a third insulating layer formed on said first metal wiring layer and said second insulating layer;

a second metal wiring layer formed on that portion of said third insulating layer which is positioned in said wiring region, and extending at right angles to said first metal wiring layer, part of said second metal wiring layer being selectively connected to one of the output terminals of said unit cell;

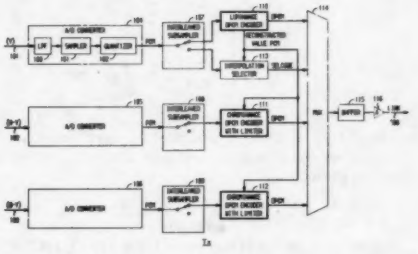
a via contact hole formed in said third insulating layer and positioned above said polysilicon wiring layer, for connecting said second metal wiring layer to said first metal wiring layer, said via contact hole having an axis aligned with that of said polysilicon wiring layer; and

a contact hole formed in said second insulating layer, for connecting said first metal wiring layer to said polysilicon wiring layer.

4,716,453
DIGITAL VIDEO TRANSMISSION SYSTEM

Robert L. Pawelski, Naperville, Ill., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jun. 20, 1985, Ser. No. 746,840
Int. Cl.[4] H04N *11/06*
U.S. Cl. 358—13 **48 Claims**



6. An arrangement for transmitting component video signals in digital form, comprising for each video component signal:

first operational means, for predicting a value of a first sample of the component video signal;

a plurality of sets of representative values of quantization levels of signal prediction errors;

second operational means, coupled to the first means and to the plurality of sets, for selecting a set of the signal error-representative values on the basis of the predicted value of only the first sample of the signal;

third operational means, coupled to the first means and to the selected set, for selecting a signal error-representative value from the selected set of signal error-representative values on the basis of difference between the predicted value and an actual value of the first sample of the signal; and

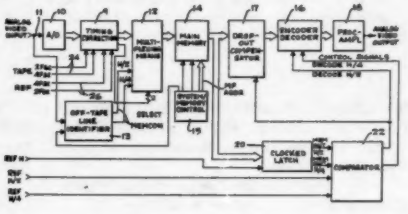
fourth operational means, responsive to the selected value, for generating a code indicating the selected signal error-representative value; and the arrangement further comprising:

fifth operational means, coupled to each fourth means, for transmitting on a communication medium the generated codes.

4,716,454
CHROMA PHASE WORD ENCODE/DECODE IN A VIDEO PROCESSING SYSTEM

Reginald W. Oldershaw, Redwood City, and Steven D. Wagner, San Jose, both of Calif., assignors to Ampex Corporation, Redwood City, Calif.

Filed Oct. 17, 1985, Ser. No. 788,597
Int. Cl.[4] H04N *9/47, 9/89, 5/78*
U.S. Cl. 358—18 **18 Claims**



1. A circuit for processing video data signals having horizontal sync pulses and chroma burst signals, wherein successive

horizontal lines of the video data have different chroma phase information, comprising:

means for providing a reference line type identification signal;

means for inserting data in the video data signals which identifies the chroma line type of a horizontal line;

main memory means for storing the line type information of selectable lines along with the associated video data signals to enable correcting timing errors in both the data signals and the line type information;

means for comparing the stored line type information with the corresponding reference line type identification signal to develop a line type control signal for the respective line; and

means for shifting the phase of the respective chroma signal in response to its line type control signal.

4,716,455

CHROMINANCE SIGNAL INTERPOLATION DEVICE FOR A COLOR CAMERA

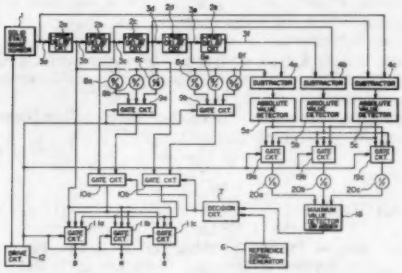
Naoki Ozawa, Kokubunji; Toshiyuki Akiyama, Kodaira; Kazuhiro Satoh, Setagaya; Syusaku Nagahara, Hachioji, and Itaru Mimura, Kokubunji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 18, 1986, Ser. No. 840,654

Claims priority, application Japan, Mar. 25, 1985, 60-58398

Int. Cl.[4] H04N *9/077, 9/04*

U.S. Cl. 358—44 **14 Claims**



1. A solid-state imaging device including a solid-state image sensor having a plurality of picture elements which are arrayed in, at least one horizontal row, and a plurality of color filters each having one of a plurality of different color transmission characteristics which are disposed in an array in correspondence with said picture elements of said solid-state image sensor, said device comprising: first output means for providing an output signal of a first picture element one of said at least one horizontal row; second output means for providing an output signal of a second picture element which is disposed at a position preceding said first picture element in said one horizontal row and which corresponds to a color filter having a different color transmission characteristic than a color filter corresponding to said first picture element; first amplification means for amplifying said output signal provided by said first output means with a gain equal to the ratio of an output signal provided by said second output means when said second picture element images an achromatic subject having a given arbitrary luminance to an output signal provided by said first output means when said first picture element images an achromatic subject having said given arbitrary luminance; decision signal generation means for generating decision signal on the basis of a difference signal representing the difference between said output signal provided by said first output means and an output signal of a third picture element which is disposed in said one horizontal row; interpolation signal generation means for generating an interpolation signal from said output signal of said second output means and an output signal of said first amplification means as a function of the magnitude of said decision signal generated by said decision signal generation means; and first gate means for selecting singals corresponding at least one of said plurality of different color transmission characteristics from said signal provided by said first output means and said interpolation signal

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4,716,456

CCD COLOR IMAGE SENSOR WITH A LIGHT SOURCE HAVING A SPECTRUM DISTRIBUTION CHARACTERISTIC PEAKS AT 470 NM AND 590 NM AND HAVING NO WAVELENGTHS ABOVE 700 NM

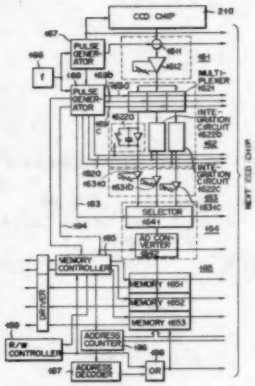
Yasuo Hosaka, Tokyo, Japan, assignor to Tokya Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Continuation of Ser. No. 565,158, Oct. 25, 1983, abandoned. This application Sep. 22, 1986, Ser. No. 910,303

Claims priority, application Japan, Oct. 28, 1982, 57-188159

Int. Cl.[4] G03F *3/08;* **404N** *1/028, 1/46*

U.S. Cl. 358—75 **23 Claims**



1. A color image sensor in combination with a light source for sensing the color image of a color document, comprising:

a light source having a spectrum distribution characteristic with a peak substantially at a wavelength of 470 nm for emitting light rays to illuminate the color document;

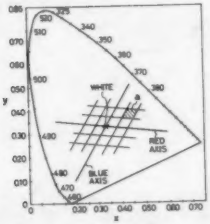
charge-coupled photosensitive converting means having a plurality of picture elements, each of the picture elements being constituted by three photosensitive sections having substantially the same specific spectrum distribution characteristic, for sensing light rays from the document to generate electric signals; and

a plurality of sets of three different color filters, said three different color filters having different specific spectrum distribution characteristics, one set of color filters being provided for each of said plurality of picture elements, the color filters of each set being positioned in the path of light rays directed to corresponding photosensitive sections of a corresponding picture element, said light source and one of said three different color filters providing a composite spectrum distribution characteristic not covering wavelengths above 700 nm.

4,716,457
ELECTRONIC ENDOSCOPIC SYSTEM

Satoshi Matsuo, Tochigi, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Feb. 24, 1987, Ser. No. 17,602
Claims priority, application Japan, Feb. 27, 1986, 61-42290
Int. Cl.[4] H04N *7/18, 9/73;* A61B *1/04, 1/06*
U.S. Cl. 358—98 5 Claims

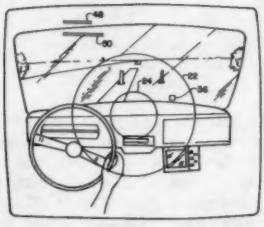


1. An electronic endoscopic system comprising:
an endoscope means having an imaging element assembled to an end thereof;
a memory means for storing color correction data with respect to a reference color, of respective sections obtained by dividing a chromaticity diagram plotted based on the imaging element; and
means for selectively addressing the color correction data stored in said memory means.

4,716,458
DRIVER-VEHICLE BEHAVIOR DISPLAY APPARATUS

Edward F. Heitzman, and Edward J. Heitzman, both of 6 Moores Mill Rd., Pennington, N.J. 08534

Filed Mar. 6, 1987, Ser. No. 22,754
Int. Cl.[4] H04N *7/18*
U.S. Cl. 358—103 26 Claims

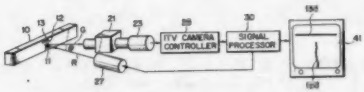


1. Driver-vehicle behavior display apparatus comprising:
means for receiving video signals corresponding to a driver's view of a course to be traversed;
means for generating first video information signals corresponding to a graphical representation of a vehicle's capabilities;
means for generating second video information signals corresponding to a vector representation of g forces imposed upon a vehicle by a driver; and
means for combining in real time said received video signals, said first video information signals and said second video information signals to form a real time composite video signal displayable as a g—g diagram superimposed upon said driver's view of said course to be traversed.

4,716,459
FATIGUE CRACK POSITION DETECTION APPARATUS

Eiichi Makabe; Mitsuaki Uesugi; Masaichi Inomata; Kyusuke Maruyama; Kenji Iwai, all of Yokohama, and Kazuo Sano, Tokyo, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

PCT No. PCT/JP86/00028, § 371 Date Sep. 16, 1986, § 102(e) Date Sep. 16, 1986, PCT Pub. No. WO86/04410, PCT Pub. Date Jul. 31, 1986
PCT Filed Jan. 24, 1986, Ser. No. 912,582
Claims priority, application Japan, Jan. 25, 1985, 60-12098; Oct. 25, 1985, 60-239025; Oct. 25, 1985, 60-239026
Int. Cl.[4] H04N *7/18;* G01N *19/08*
U.S. Cl. 358—106 6 Claims

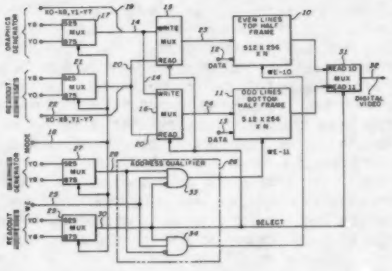


1. A method of detecting a fatigue crack position on a fatigue test piece on which a reference line is scribed, which comprises:
integrating luminance levels in the same direction as that of the reference line from an image signal,
obtaining the image signal by scanning said reference line and a crack formed in the fatigue test piece,
obtaining a reference line position from a maximum luminance level in the image signal.
converting the image signal into a binary signal,
detecting a crack distal end position by discriminating a state in which a high-level value of the binary signal is continuously detected, and
calculating a distance between the reference line position and the crack distal end position.

4,716,460
DISPLAY REFRESH MEMORY APPARATUS UTILIZING ONE HALF FRAME UPDATING

David J. Benson, Pijeras, N. Mex.; Carl H. Brown, Portland, Oreg., and William R. Hancock, Cedar Crest, N. Mex., assignors to Sperry Corporation, Great Neck, N.Y.

Filed Oct. 8, 1986, Ser. No. 916,580
Int. Cl.[4] H04N *7/01*
U.S. Cl. 358—140 8 Claims



1. Refresh memory apparatus for use in a display system having means for generating a raster and means for providing digital signals synchronous with respect to said raster, said apparatus comprising:
first memory means for storing a first portion of a frame of image signals,
second memory means for storing a second portion of a frame of image signals,
said first and second portions comprising an entire frame of image signals, and

switching means responsive to said digital signals for alternately: (A) controlling said first memory means for writing updated image signals into said first memory means with respect to said first portion while controlling said second memory means for reading out said second portion stored therein to said display system and (B) controlling said second memory means for writing updated image signals into said second memory means with respect to said second portion while controlling said first memory means for reading out said second portion stored there in to said display system.

4,716,461
VIDEO SIGNAL BLANKING INTERVAL SIGNAL CONDITIONING CIRCUIT

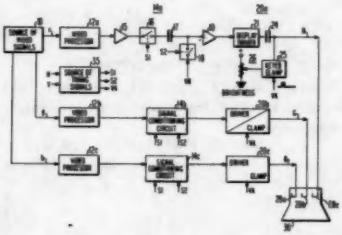
Werner Hinn, Zollikerberg, assignor to RCA Corporation, Princeton, N.J.

Filed Apr. 29, 1986, Ser. No. 857,047

Claims priority, application United Kingdom, Oct. 1, 1985, 8524200

Int. Cl.[4] H04N *3/24, 5/18*

U.S. Cl. 358—165 **10 Claims**



1. In a system for processing a wideband video signal including an image interval and a blanking interval, apparatus for conditioning said video signal to exhibit a reference level during said blanking interval, said apparatus comprising:

a video signal path having an imput and an output;

a capacitor for coupling a video signal from said input to said output of said video path;

first switching means coupled in series with said capacitor in said signal path, said first switching means having a control input for receiving a timing signal for causing said first switching means to (a) exhibit a conductive state during said image interval and during a prescribed reference portion of said blanking interval for enabling said video signal to be conveyed from said input to said output of said video path via said capacitor, and (b) exhibit a nonconductive state during remaining portions of said blanking interval to prevent said video signal from being conveyed to said output of said video path via said capacitor during said remaining portions of said blanking interval; and

second switching means coupled to said capacitor and to a reference potential, said second switching means having a control input for receiving a timing signal for causing said second switching means to (a) exhibit a conductive state for the duration of said blanking interval whereby said reference potential is coupled to said capacitor, and (b) exhibit a nonconductive state at other times.

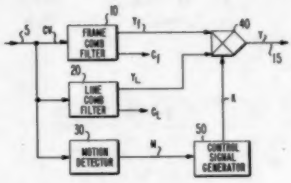
4,716,462
MOTION ADAPTIVE TELEVISION SIGNAL PROCESSING SYSTEM

Robert A. Wargo, Ringoes; Leopold A. Harwood, Bridgewater; Dalton H. Pritchard, Princeton, and Michael S. Chartier, Sayerville, all of N.J., assignors to RCA Corporation, Princeton, N.J.

Filed Nov. 25, 1986, Ser. No. 934,923

Int. Cl.[4] H04N *5/21*

U.S. Cl. 358—166 **18 Claims**



1. A television signal processing system, comprising:

a source of a television signal;

means, coupled to said source, for estimating image changes over at least one image scan time interval;

means, coupled to said source, for adaptively processing said television signal in response to a control signal; and

means, coupled between said estimator and said adaptive processor, for generating said control signal exhibiting a function substantially described by:

$$K = Ae^{-b/x}$$

where K is the value of said control signal, A is the maximum value said control signal can attain, x is said estimated change, and b is a constant.

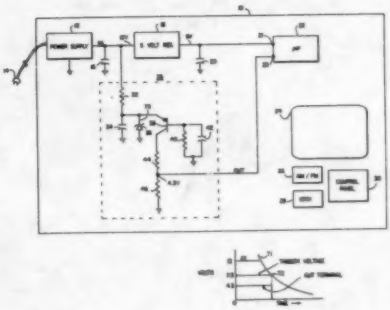
4,716,463
POWER DOWN SENSE CIRCUIT

Carl W. Stacy, Elmwood Park, and William Chamberlain, Lombard, both of Ill., assignors to Zenith Electronics Corporation, Glenview, Ill.

Filed Oct. 24, 1986, Ser. No. 922,640

Int. Cl.[4] H04N *5/63*

U.S. Cl. 358—190 **6 Claims**



1. A television receiver including a microprocessor having memory and timekeeping functions, said microprocessor having a sleep mode activated by a trigger voltage applied to a sleep terminal for operating said microprocessor with minimal power consumption to maintain said memory and timekeeping functions during a power failure comprising:

a power supply including a voltage regulator;

a filter capacitor coupled to the output of said voltage regulator and supplying a power input for said microprocessor; and

sense means coupled between the input of said regulator and

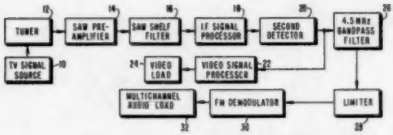
the sleep terminal of said microprocessor for developing said trigger voltage for said microprocessor in the event said input voltage to the regulator falls below a predetermined level.

4,716,464

SINGLE CHANNEL IF FOR VIDEO AND AUDIO

Robert P. Parker, Indianapolis, Ind., assignor to RCA Corporation, Princeton, N.J.

Filed Apr. 30, 1986, Ser. No. 858,457
Int. Cl.[4] H04N *5/62, 5/44, 7/04*
U.S. Cl. 358—197 **17 Claims**



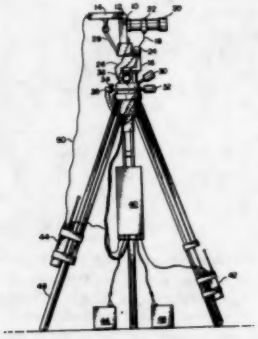
1. A television receiver for a TV signal comprising picture and sound carrier signals, including radio frequency (RF) tuner means having a first nonzero amplitude versus frequency response over a predetermined frequency range intermediate upper and lower adjoining frequency ranges, and an intermediate frequency (IF) section coupled thereto for processing said signals, said RF tuner and IF section having an overall transmission characteristic exhibiting a Nyquist attenuation slope over said upper and lower frequency ranges respectively adjoining said predetermined frequency range intermediate said upper and lower frequency ranges, wherein to compensate for said first response said IF section exhibits a second nonzero amplitude versus frequency response, different from said first response, over said predetermined frequency range such that said overall transmission characteristic exhibits substantially no variation of attenuation with frequency in said predetermined frequency range.

4,716,465

DEVICE FOR WIRELESS VIDEO MONITORING AND CONTROL OF A STILL CAMERA

Peter Meyer, 1213 Talley Rd., Wilmington, Del. 19809

Filed Aug. 20, 1986, Ser. No. 898,367
Int. Cl.[4] H04N *5/232*
U.S. Cl. 358—210 **13 Claims**



1. A method for video monitoring and control of a still camera comprising the steps of:

(a) mounting a still camera, that has a viewfinder and a lens, a shutter means and is on a support means that permits vertical and horizontal movement;

(b) connecting the lens of said still camera to a servo motor device;

(c) connecting servo motors to the support means that permits vertical and horizontal movement and to the lens;

(d) connecting a control means to said servo motors;

(e) further connecting said control means to a receiver means for receiving transmitted control signals;

(f) mounting a television camera to the viewfinder of said camera;

(g) connecting said television camera to a transmitting device for transmitting an electronic signal to a video receiving device;

(h) transmitting control signals to said receiver means by means of a remotely located short wave transmitting device at the same time that the person transmitting the signals is able to view the image seen on the video receiving device;

(i) using a power generating means for supplying power to the control means;

(j) connecting said television transmitter and receiving means to said control means; and

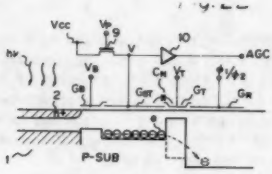
(k) controlling the shutter means electronically and by remote control.

4,716,466

IMAGE SENSOR

Takashi Miida, Tokyo; Akira Takei, Yokohama, and Kiyoshi Tashiro, Chiba, all of Japan, assignors to Fujitsu Limited, Kanagawa, Japan

Filed May 28, 1985, Ser. No. 738,331
Claims priority, application Japan, May 31, 1984, 59-111221
Int. Cl.[4] H04N *3/14;* **H01L** *29/78*
U.S. Cl. 358—213.26 **13 Claims**



1. An image sensor comprising:

charge storage means having MIS capacitors for storing charges corresponding to the amount of light received, each of said MIS capacitors having an electrode;

charge transfer means having a plurality of stages for storing charges transfered from said charge storage means, said charges stored in said stages being transfered sequentially;

transfer gate means for transfering charges from said charge storage means to said stages of said charge transfer means in response to a timing control signal;

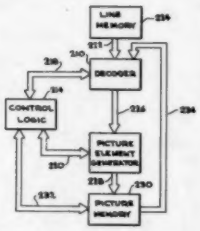
changing means for changing an electric potential of said electrode of each of said MIS capacitors in accordance with the amount of said charge stored in said MIS capacitors; and

detecting means for detecting said electric potential of said electrode and for outputting the detected electric potential for generating said timing control signal.

4,716,467
SPEED-UP METHOD AND APPARATUS FOR TWO-DIMENSIONAL FACSIMILE CODING AND DECODING

Vinod Menon, Sunnyvale, and Shinkyo Kaku, Los Gatos, both of Calif., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Feb. 27, 1985, Ser. No. 706,201
Int. Cl.[4] H04N *1/41*
U.S. Cl. 358—260 **10 Claims**



1. In a facsimile system for digitized picture elements of units of alternating color employing a method for encoding/decoding a scan line of said digitized picture elements with respect to a reference line of said digitized picture elements, a method for improving said encoding/decoding speed comprising the steps of:

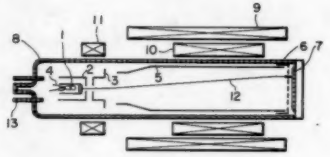
(a) detecting a uni-color scan line during said encoding/decoding of said scan line and recording the color of said picture elements in said uni-color scan line; and

(b) encoding or decoding a line next-following said uni-color line detected in step (a) with respect to a reference line comprising a uni-color line having all its digitized picture elements of said color recorded in step (a), and without reference to said uni-color line detected in step (a).

4,716,468
APPARATUS FOR CONTROLLING THE ELECTRON BEAM IN A TELEVISION CAMERA TUBE

Masanori Maruyama, Kokubunji; Kenji Takahashi, Kanagawa; Koji Kudo, Hachioji; Masanori Hombaugh, Mitaka, and Shusaku Nagahara, Hachioji, all of Japan, assignors to Hitachi, Ltd. and Hitachi Denshi Kabushiki Kaisha, both of Tokyo, Japan

Filed Apr. 23, 1986, Ser. No. 854,865
Claims priority, application Japan, Apr. 24, 1985, 60-86400
Int. Cl.[4] H04N *5/235*
U.S. Cl. 358—219 **8 Claims**



1. A television camera tube device comprising:

a target disposed adjacent to one end of a camera tube to produce a charge pattern corresponding to the luminous intensity of an object;

an electron gun disposed adjacent to the other end of the camera tube to generate an electron beam for scanning said target, said electron gun including a cathode emitting electrons, a first grid disposed between said cathode and said target to be applied with a first predetermined voltage and having a first aperture, and a second grid disposed between said first grid and said target to be applied with a second predetermined voltage and having a second aperture smaller than said first aperture; and

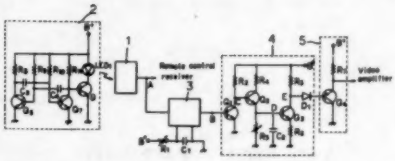
means for controlling the voltages applied to said first and second grids for providing the electron beam quantity corresponding to the luminous intensity of the object forming the charge pattern on said target;

wherein the voltages applied to said first and second grids are both positive relative to said cathode, and said voltage control means decreases the voltage applied to said first grid and increases the voltage applied to said second grid, so that a drive curve changes substantially rectilinearly relative to an increase in the luminous intensity of said object.

4,716,469
CIRCUIT FOR EYESIGHT PROTECTION IN A TELEVISION SET

Eui D. Kim, and Hyun J. Choi, both of Kumi, Rep. of Korea, assignors to Gold Star Co., Ltd., Seoul, Rep. of Korea

Filed May 29, 1986, Ser. No. 868,246
Claims priority, application Rep. of Korea, Oct. 25, 1985, 14051/1985
Int. Cl.[4] H04N *5/65*
U.S. Cl. 358—245 **5 Claims**



1. An eyesight protection circuit for a television set having a remote control infrared signal receiving-amplifying portion **1**, characterized by an infrared transmitter **2** installed in a front side of said television set so that the infrared pulse signals emitted from said infrared transmitter **2** are received on said remote control receiving-amplifying portion **1** after reflecting upon a viewer within a predetermined distance of the screen of said television set, said remote control receiving-amplifying portion **1** having an output interconnected to the input of a monostable multivibrator **3** to apply there to output signals from said remote control receiving-amplifying portion **1** in response to the signals reflected from the viewer, a delay circuit portion **4** having an input adapted to interconnected to the output of said monostable multivibrator **3** outputting higher level signals when higher level signals are applied on the input thereof over a predetermined time and otherwise outputting lower level signals, and a video amplifier driving circuit portion **5** for controlling the "ON" and "OFF" of a video amplifier in response to said ower and higher level signals respectively, having an input interconnected to the output of said delay circuit portion and an output adopted to be connected to a said video amplifier associated with said television set.

4,716,470
METHOD FOR PREVIEWING UNDEVELOPED FILM

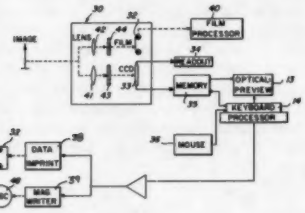
Alfred B. Levine, 2924 Terrece Dr., Chevy Chase, Md. 20815

Division of Ser. No. 834,923, Feb. 28, 1986, which is a continuation-in-part of Ser. No. 617,344, Jun. 4, 1984, Pat. No. 4,588,282. This application Feb. 25, 1987, Ser. No. 18,577
Int. Cl.[4] H04M *1/00*
U.S. Cl. 358—256 **20 Claims**

1. A method of previewing exposed but undeveloped still image frames in a photographic film prior to development of the film, comprising the steps of:

obtaining and recording a series of corresponding electronic

images substantially concurrently with the exposure of each of a corresponding series of frames of the photographic film,



optically previewing each of the recorded electronic images prior to developing the photographic film, to select those frames of interest,

and recording instructions pertaining to the selected frames.

4,716,471

DATA DECODING APPARATUS

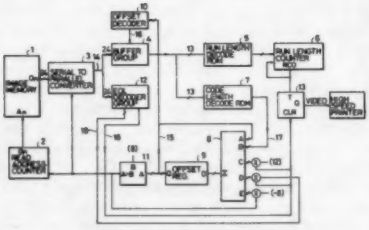
Yoshikazu Yokomizo, Kawagoe, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 581,436, Feb. 17, 1984, abandoned. This application Feb. 25, 1987, Ser. No. 18,868

Claims priority, application Japan, Feb. 25, 1983, 58-31172; Feb. 25, 1983, 58-31173; Feb. 25, 1983, 58-31174

Int. Cl.[4] H04N *1/21, 1/23, 1/40, 1/419*

U.S. Cl. 358—296 **40 Claims**



1. A data decoding apparatus for decoding codes obtained by compression, comprising:

memory means for storing a plurality of codes which are to be decoded and which are of variable length;

read means for reading out a predetermined amount of data from said memory means on a parallel basis, said predetermined amount of data being less than the amount of data stored in said memory means;

decoding means for decoding a code contained in data read out in parallel from said memory means; and

control means for controlling operation of said read means, said control means identifying code stored in said memory means and causing said read means to read out in parallel data containing the identified code from said memory means.

4,716,472

VARIABLE SPEED REPLAY OF DIGITAL AUDIO WITH CONSTANT OUTPUT SAMPLING RATE

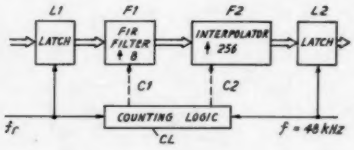
Guy W. W. McNally, Burrowswood Lodge, Lawbrook Lane, Shere, Surrey, England

Filed Aug. 21, 1985, Ser. No. 768,030

Claims priority, application United Kingdom, Aug. 23, 1984, 8421378

Int. Cl.[4] G11B *5/09, 27/28;* **H03H** *17/06;* **G06F** *7/62*

U.S. Cl. 360—8 **10 Claims**



6. Apparatus for effecting variable speed replay of digital audio with a constant output sampling rate, characterised by a demand-fed buffer responsive to pulses establishing an input replay rate to provide digital input samples, an interpolating device responsive to the displacement between an output sample at the constant rate and a sample at the input rate to create output samples at the constant rate, a manually operable device emitting pulses at a rate determined by the rate of actuation of the device, a counter counting the emitted pulses over fixed intervals of time to produce a regularly updated first number proportional to the input rate, an overflowing accumulator means clocked at a multiple of the constant rate to add in said first number and produce overflow pulses at the input rate, and a second overflowing accumulator means clocked at the constant rate to add in the said first number and produce a second number representing said displacement.

4,716,473

DEVICE FOR MODIFYING PROGRAM DURATION ON A TAPE PLAYER

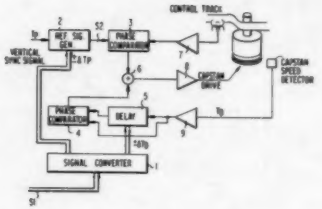
Shigeyuki Kondo, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Continuation-in-part of Ser. No. 521,796, Aug. 9, 1983, abandoned. This application Nov. 26, 1986, Ser. No. 936,916

Claims priority, application Japan, Aug. 9, 1982, 57-138322

Int. Cl.[4] H04N *5/78;* **G11B** *21/04, 15/52*

U.S. Cl. 360—9.1 **2 Claims**



1. A program playing time duration modifying apparatus to be coupled with a capstan motor for feeding a tape, comprising:

a signal source generating a difference signal corresponding to a difference between a time constant of a program and a playing time;

signal producing means (1) responsive to said difference signal for producing a tape-speed-varying signal and a reference-signal-varying signal;

capstan tack signal generating means coupled to said capstan

motor for generating a capstan tack signal corresponding to the running speed of said capstan motor;

capstan tack delay means (5) coupled to said capstan tack signal generating means and said signal producing means for delaying said capstan tack signal by a time that is varied by said tape-speed-varying signal to produce a delayed tack signal;

first phase comparing means (4) for comparing said capstan tack signal and said delayed tack signal to generate a first speed control signal;

signal receiving means for receiving a capstan reference signal having a predetermined period that serves as a reference for a normal tape speed;

period varying means (2) coupled to said signal receiving means and said signal producing means for varying said predetermined period of said capstan reference signal by said reference-signal-varying signal;

control track signal producing means (7) for producing a control track signal from a control track of a tape, said control track signal indicating a video frame period on said tape in which said capstan reference signal has been recorded;

second phase comparing means (3) for comparing said capstan reference signal with the varied period and said control track signal to generate a second speed control signal; and

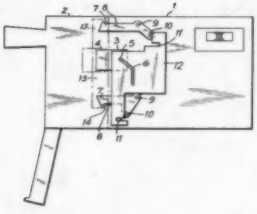
adder means (6) for adding said first and second speed control signals to generate a third speed control signal, wherein a speed of said capstan motor is controlled by said third speed control signal.

4,716,474

CAMERA-COMBINED MAGNETIC RECORDING-REPRODUCING SYSTEM

Takao Kiuchi, Tokyo, Japan, assignor to Fuji Photo Film Co., Ltd., Japan

Filed Jul. 8, 1986, Ser. No. 883,145
Claims priority, application Japan, Jul. 10, 1985, 60-149941
Int. Cl.[4] G11B *33/06*
U.S. Cl. 360—33.1 **4 Claims**



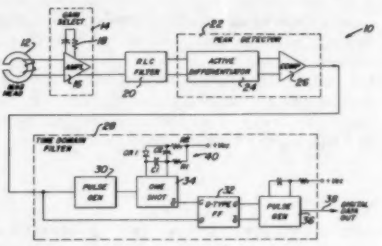
1. A camera-combined magnetic recording-reproducing system comprising a camera unit and a magnetic recording-reproducing unit, having a connector consisting of a one-side terminal disposed on one of connection parts to be engaged of said camera unit and said magnetic recording-reproducing unit to be combined and an other-side terminal projectably and withdrawably disposed on the other of said connection parts, said other-side terminal being connected with said one-side terminal by operating an external operation means when said connection parts are engaged, and a locking mechanism for locking said connection parts interlockingly with connection of said connector by operating said external operation means.

4,716,475

READ POST COMPENSATOR CIRCUIT FOR MAGNETIC RECORD/REPRODUCE DEVICE

Alan P. Dutcher, 221 Holly Ct., Bensalem, Pa. 19020

Filed Jun. 17, 1986, Ser. No. 875,416
Int. Cl.[4] G11B *5/09*
U.S. Cl. 360—45 **12 Claims**



1. A read post compensator circuit for a magnetic record/reproduce device comprising:

(a) transducer means for reading a sequence of magnetically coded data bits from a magnetic medium and generating an electrical signal representative of the magnetically coded data bits, the electrical signal having a sequence of peak values corresponding to said data bits, the time intervals between successive peak values being variable,

(b) peak detector circuit means for detecting the peak values of the electrical signal, and

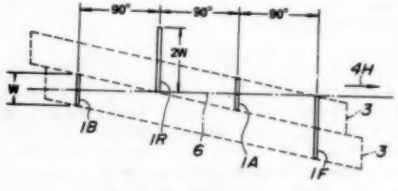
(c) time domain filter means for generating output data bits corresponding to detected peak values of the electrical signal and for dynamically varying the period between successive output data bits in direct relation to the time interval between corresponding peak values to automatically compensate for peak shifting of the electrical signal, the time domain filter having holding circuit means for holding successive peak values for a variable time interval and timing circuit means for generating a sequence of gating signals, the time interval between successive gating signals being dynamically variable in direct relation to the time interval between corresponding magnetically coded data bits, the holding circuit means being responsive to the gating signals for generating an output data bit upon the occurrence of a gating signal.

4,716,476

TAPE RECORDING APPARATUS

Hiroshi Okada; Takao Takahashi, and Hajime Inoue, all of Tokyo, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Jan. 10, 1986, Ser. No. 817,544
Claims priority, application Japan, Feb. 5, 1985, 60-20682
Int. Cl.[4] G11B *5/03, 15/14*
U.S. Cl. 360—66 **15 Claims**



1. A tape recording apparatus having a tape guide drum on which the tape is helically wrapped, comprising:

(a) recording transducer means including a pair of recording

heads mounted on a rotary body of said tape guide drum at the same height but 180 degrees apart from each other relative to the rotational direction of said rotary body so as to form a plurality of skewed tracks on said tape;

(b) tape drive means for running said tape in both forward and reverse directions on command;

(c) first erase head means secured on said rotary body at a position lower than said recording transducer means for erasing a pair of said skewed tracks simultaneously when said tape is driven in the forward direction by said tape drive means; and

(d) second erase head means secured on said rotary body at a position higher than said recording transducer means for erasing a pair of said skewed tracks simultaneously when said tape is driven in the reverse direction of said rotary body.

4,716,477

MECHANISM FOR AUTOMATICALLY LOADING A CASSETTE IN RECORDING AND/OR REPRODUCING APPARATUS INCLUDING PINCHING MEANS FOR APPLYING VARYING PINCHING ACTION

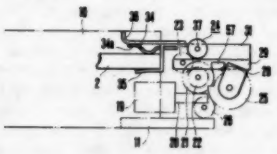
Tsukasa Uehara, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 13, 1984, Ser. No. 670,749

Claims priority, application Japan, Nov. 15, 1983, 58-213238; Nov. 15, 1983, 58-213239; Nov. 15, 1983, 58-213240; Nov. 15, 1983, 58-213241; Nov. 15, 1983, 58-213242

Int. Cl.[4] G11B *17/04, 15/68*

U.S. Cl. 360—97 **8 Claims**



1. In an apparatus using a record bearing medium container, a record bearing medium container loading device comprising:

container holding means having an elastic member and a container receiving member, said holding means pinching said container elastically between the elastic member and the container receiving member;

control means for controlling the pinch force of said elastic member of said holding means against the container pinched thereby; and

driving means for automatically carrying said container holding means into the apparatus in a predetermined inserting direction;

wherein the control means increaes said pinching force of said elastic member against the container pinched between said elastic member and said container receiving member as said driving means moves the container holding means into the apparatus.

4,716,478

TWO POINT ATTACHMENT WITH SINGLE POINT CLAMPING FOR CONNECTING THE ARM STACK TO THE ACTUATOR MEMBER IN A DISC MEMORY DRIVE

Edward Walsh, and David W. Wolto, both of Boise, Id., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Feb. 14, 1986, Ser. No. 829,688

Int. Cl.[4] G11B *21/08, 21/24, 21/16*

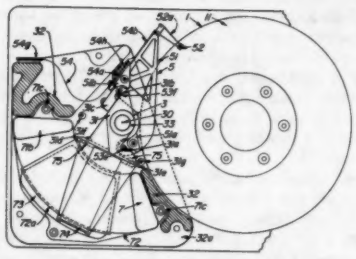
U.S. Cl. 360—104 **13 Claims**

1. In a disc drive assembly having rotatable memory discs and transducer heads for deriving information from said discs, means for supporting and moving said transducer heads over said discs, comprising:

a. an actuator structure having a pivotally mounted actuator member, said transducer member having two spaced attachment supports;

b. an armstack unit comprising individual arms mounting at least one transducer head thereon at one end and having center-to-center arm spacings corresponding to the center-to-center axial spacings of said discs;

c. two attachment members on said armstack unit adjacent the end thereof opposite said transducer heads and space to engage said attachment supports on said actuator member;



d. one of said attachment supports comprising a notch and the other of said attachment supports having a face portion disposed at an acute angle to a line from said notch which intersects said face portion, one of said attachment members engaging said notch and the other of said attachment members engaging said face portion; and

e. means engaging and applying a force to said other of said attachment members acting in a direction substantially paralleling said face portion to securely engage said one attachment member in said notch and to securely engage said other of attachment members with said face portion.

4,716,479

MAGNETIC DISK HEAD OPENING MECHANISM WITH AN EXPANDED OPENING RANGE

Yuzo Sakamoto, and Kazuo Koike, both of Kanagawa, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

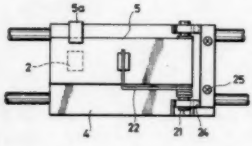
Continuation of Ser. No. 674,324, Nov. 23, 1984, abandoned.

This application Mar. 19, 1987, Ser. No. 28,059

Claims priority, application Japan, Nov. 24, 1983, 58-221141

Int. Cl.[4] G11B *21/22*

U.S. Cl. 360—105 **9 Claims**



1. A magnetic disk head opening apparatus, for a flexible magnetic disk having magnetic recording layers on both sides, allowing opening to a vertical position from a normal horizontal position, said apparatus comprising:

a carriage;

a first magnetic head provided on said carriage;

an arm;

a second magnetic head provided on said arm which is

rotatable with respect to said carriage, said first and second magnetic heads arranged to confront each other through the flexible disk; and

a rotation mechanism comprising:

a supporting member having a pair of V-shaped grooves arranged spaced apart from each other in a line forming a rotation space;

a pair of rotation fulcrum pins arranged in correspondence to said pair of V-shaped grooves, rotatably supported by said pair of V-shaped grooves and coupled to said arm, the rotation space allowing said arm to rotate from the normal horizontal position to substantially the vertical position exposing the second magnetic head for examination without decoupling said arm from said carriage;

a closure spring coupled between said arm and said carriage, and urging said arm to rotate about said fulcrum pins; and

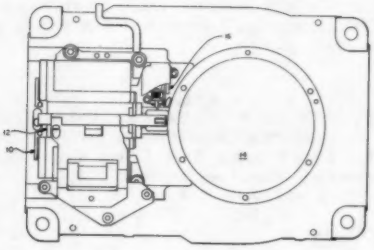
a pair of elastic urging members which urge said rotation fulcrum pins into contact with said V-shaped grooves at all times.

4,716,480

CARRIAGE LATCH FOR A DISC DRIVE

John P. Wiens, Santa Clara, and Clifford T. Jue, Santa Cruz, both of Calif., assignors to Seagate Technology, Scotts Valley, Calif.

Filed Aug. 29, 1986, Ser. No. 901,678
Int. Cl.[4] G11B *5/55, 21/08*
U.S. Cl. 360—105 **9 Claims**



1. In an actuator having a frame and a transducer carriage for positioning a transducer with respect to a recording media, a dynamic lock mechanism for holding said carriage in a fixed position relative to said frame comprising

a plunger guided by a solenoid and a further frame for movement between a first position wherein said plunger engages an extension on said carriage to lock said carriage in said fixed position and a second position wherein said plunger is withdrawn from said carriage to allow said carriage to position said transducer with respect to a recording media,

spring means surrounding said plunger for normally biasig said plunger into said first position,

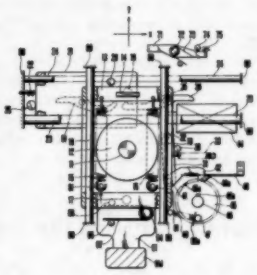
said solenoid being responsive to a signal to withdraw said plunger from said first position to said second position, and shock absorbing means comprising a counterweight pivotally linked to said plunger for absorbing a shock applied to said frame and preventing movement of said plunger away from said first position in the absence of actuation of said solenoid.

4,716,481

RECORDING AND/OR REPRODUCING APPARATUS HAVING AN IMPOSED HEAD SHIFTING FEATURE

Nobuo Tezuka, Kanagawa, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 495,424, May 17, 1983, abandoned. This application Aug. 21, 1986, Ser. No. 899,750
Claims priority, application Japan, May 26, 1982, 57-89099; May 26, 1982, 57-89100; Jun. 2, 1982, 57-94365
Int. Cl.[4] G11B *5/54, 5/58, 5/82*
U.S. Cl. 360—106 **10 Claims**



1. A recording and/or reproducing apparatus comprising:

(A) a head for signal recording and/or reproducing against a recording medium in a predetermined loaded position;

(B) a movable carriage member for carrying said head along a surface of said medium between a first and a second position;

(C) a spring member for urging said carriage member in a direction from said first to said second position along said surface of said medium;

(D) control means including a cam member for controlling the movement of said carriage member in said direction by an urging force of said spring member;

(E) reset means for shifting said carriage member to said first position and for charging said spring member; and

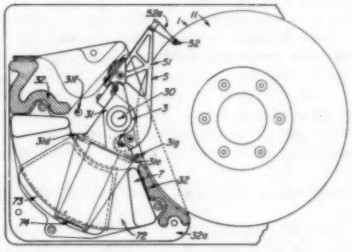
(F) eject means responsive to said shifting operation of said reset means for ejecting said medium from said loaded position.

4,716,482

HEAD ACTUATOR LIMIT STOP ASSEMBLY FOR A DISK MEMORY DRIVE

Edward Walsh, Boise, Iowa, assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Feb. 14, 1986, Ser. No. 829,686
Int. Cl.[4] G11B *21/08*
U.S. Cl. 360—106 **6 Claims**



1. In a disc memory drive having a housing, a rotatable memory disc, a transducer head for deriving information from said memory disc, and a movably mounted actuator structure

for supporting and bidirectionally moving said transducer head between radial limits in a transducer head path adjacent the surface of said memory disc, the improvement comprising:

a. a pair of impact members on said movably mounted actuator structure, each impact member moving with said actuator in a predetermined impact member path;

b. a pair of rod shaped limit stops, one for each impact member;

c. axially spaced bearings on each rod shaped limit stop;

d. journals in said housing journaling said bearings and supporting each rod shaped limit stop in a respective impact member path to be engaged by the respective one of said pair of impact members at a location on each rod shaped limit stop intermediate said axially spaced bearings; and

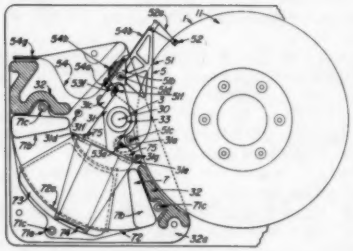
e. a radially eccentric portion on each rod shaped limit stop at said location so that rotation of said rod shaped limit stop adjusts the limit of movement of the associated impact member in said predetermined impact member path for controlling the radial limits of movement of said transducer head in said transducer head path.

4,716,483

THREE PIECE HEAD ACTUATOR ARM ASSEMBLY FOR DISC DRIVE

Edward Walsh, Boise, Id., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Feb. 14, 1986, Ser. No. 829,687
Int. Cl.[4] G11B *21/08, 21/16*
U.S. Cl. 360—106 **4 Claims**



1. In a disc drive assembly having a rotatable memory disc and a transducer head for deriving information from said memory disc, means for supporting and moving said transducer head over said memory disc comprising:

a. an actuator structure having side sections and upper and lower section providing a front and a rear opening;

b. an actuator member having front and rear sections;

c. bearing means in said upper and lower sections of said actuator structure mounting said actuator member for angular movement and positioning said front and rear sections of said actuator member in locations accessible at said front opening of said actuator structure;

d. a unitized transducer head support structure;

e. fastening means detachably mounting said support structure on said front section of said actuator member in a position projecting from said front opening of said actuator structure, said fastening means being accessible and actuatable at the front of said actuator structure without removing said actuator member from said support structure;

f. a magnetic driver having a housing and a movable member;

g. means detachable securing said housing to said actuator structure with said movable member adjacent said rear face of said actuator member; and

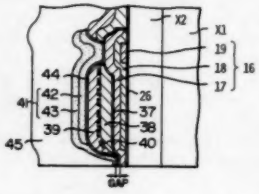
h. fastening means accessible and actuatable at said front opening, for detachably securing said movable member to said actuator member at said rear face.

4,716,484

MAGNETIC HEAD COMPRISING A CORE FORMED OF SMALL AND LARGE THIN FILM PATTERNS

Nobuyuki Kaminaka, Neyagawa, and Yasuo Yoshida, Kumamoto, both of Japan, assignors to Matsushita Electrical Industrial Co., Ltd., Osaka, Japan

Filed Jun. 12, 1984, Ser. No. 619,917
Claims priority, application Japan, Jun. 13, 1983, 58-105200
Int. Cl.[4] G11B *5/127, 5/147*
U.S. Cl. 360—125 **1 Claim**



1. A thin film magnetic head comprising

a substrate;

a first magnetic core including

a first magnetic film deposited on said substrate;

a second magnetic film deposited over said first magnetic film and said substrate, said second magnetic film having a larger surface area than said first magnetic film; and

a third magnetic film deposited over and completely covering said second magnetic film, said third magnetic film having a larger surface area than said second magnetic film;

a second magnetic core comprising at least two magnetic films deposited on said first magnetic core; and

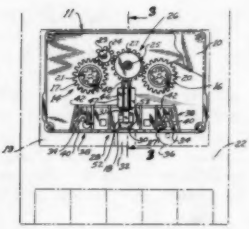
a coil interposed between said first and second magnetic cores, said first and second magnetic cores being separated by a magnetic gap layer thereby defining a magnetic transducer gap.

4,716,485

CARTRIDGE-SHAPED CLEANING DEVICE WITH A ROTABLE CLEANING ASSEMBLY

Choi K. Yeung, Woodland Heights, Hong Kong, assignor to Recoton Corporation, Long Island City, N.Y.

Filed Mar. 29, 1985, Ser. No. 717,450
Int. Cl.[4] G11B *5/41*
U.S. Cl. 360—128 **8 Claims**



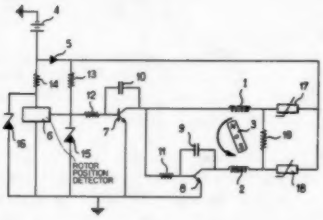
1. A cartridge-shaped cleaning device adapted to clean a head and tape drive assembly of a cassette player and/or recorder unit of the type having a head provided with a face having a portion that lies in a plane, a recess capable of receiving a tape cassette, and tape transport means including a pair of spaced spindles to drive the tape of said cassette and a pinch roller and capstan, said device comprising a cassette housing configured to fit within the recess; a drive system having first

and second hub gears rotatably mounted in said housing and adapted to engage respective spindles of the player/recorder unit when the device is within said recess; transmission means operatively engaging said first and second hub gears for transferring a driving force from one hub gear to the other; a head cleaning assembly mounted in said housing having a cleaning element positionable against the head of the player/recorder unit when the device is within said recess; and rotary drive means driven by said tape transport means and coupled to the head cleaning assembly and adapted to impart rotary movement to the cleaning element about an axis substantially perpendicular to the plane of the face of the head of the player/recorder unit such that said cleaning element remains in contact with the face of said head substantially throughout the rotary movement of said cleaning element.

4,716,486
ELECTRIC MOTOR COMPRISING A THERMISTOR-TYPE OVERCURRENT PROTECTION DEVICE

Janusz Sobiepanek, Gif/Yvette, and Simon Aboukrat, Garges Lès Gonesse, both of France, assignors to Etudes Techniques et Representations Industrielles E.T.R.I., Neuilly-sur-Seine, France

Filed Mar. 3, 1986, Ser. No. 835,303
Claims priority, application France, Mar. 15, 1985, 85 03858
Int. Cl.[4] H02H *5/04, 7/08*
U.S. Cl. 361—24 **3 Claims**



1. An electronically switched direct-current motor comprising at least two motor windings (1, 2), and a device used in protection against overcurrent in the motor windings (1, 2) and in aid of motor restart after a stoppage of the motor, wherein said device comprises at least two positive temperature coefficient thermistors (17, 18), one (17) of said thermistors being series-connected with a first motor winding (1) whilst the other thermistor (18) is series-connected with a second winding (2), each thermistor being thermally independent from the other, wherein said first winding and said one of said thermistors, and said second winding and said other thermistor, when energized, have electrically parallel current paths between a source of direct current and the ground.

4,716,487
APPARATUS FOR MONITORING MOTOR WINDING LEAKAGE

Joseph G. Horvath, Astatula, and James C. Miller, Tavares, both of Fla., assignors to Automeg, Inc., Astatula, Fla.

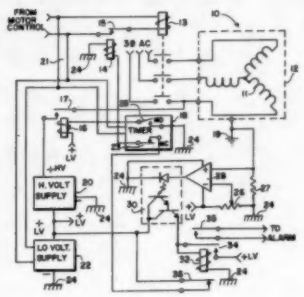
Filed May 5, 1986, Ser. No. 859,365
Int. Cl.[4] H02H *3/16*
U.S. Cl. 361—42 **7 Claims**

1. In an electric motor having an electrical winding, controlled by a contactor and having a source of control voltage for operating said contactor, a system for automatically monitoring the insulation leakage resistance of said electric motor winding prior to each operation of said motor comprising:

power supply means for supplying a source of high-voltage direct current and having a system ground;

timing means connected to said power supply means and to said source of control voltage, said timing means being responsive to said control voltage to connect said high voltage to the electrical winding for a short period of time and to thereafter apply said control voltage to said contactor;

a sense resistor connected from a frame of said motor to said system ground; and

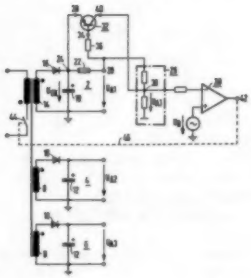


comparator means connected across said sense resistor for producing an indication when a voltage across said resistor due to flow of leakage current exceeds a preselected value.

4,716,488
PRIMARY SWITCHED-MODE POWER SUPPLY UNIT

Bernd Segger, Erlangen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Apr. 23, 1986, Ser. No. 855,535
Claims priority, application Fed. Rep. of Germany, May 23, 1985, 3518621
Int. Cl.[4] H02H *9/04*
U.S. Cl. 361—88 **4 Claims**



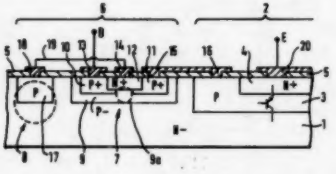
1. A primary switched-mode power supply unit with a plurality of electrically isolated secondary circuits, each of said secondary circuits having a secondary winding connected to a respective series circuit of a rectifier and a filter capacitor, one of said series circuits having a fuse connected between the connection point of said rectifier and said filter capacitor and an output of the respective-secondary circuit, said output is connected to an actual-value sensor, and said actual-value sensor is connected to a controller, comprising: a switch connected from the connection point of the filter capacitor and the fuse to an output terminal of the actual-value sensor.

4,716,489

BREAKDOWN PROTECTED PLANAR TRANSISTOR DEVICE

Kaoru Imamura, and Kenichi Muramoto, both of Kawasaki, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 27, 1985, Ser. No. 813,841
Claims priority, application Japan, Dec. 28, 1984, 59-279937
Int. Cl.[4] H02H 3/20
U.S. Cl. 361—91 9 Claims



1. A transistor device which will not break down in the event of an accident such as load short circuiting but will continue to operate, said transistor device comprising:

a bipolar transistor; and

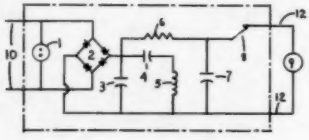
protection means for protecting said bipolar transistor from being damaged due to the accidental application of a high voltage to the collector of said transistor wherein said protection means consists essentially of a single junction type field effect transistor which is responsive to said high voltage to reduce the base current of said transistor without eliminating said base current thereby maintaining the operation of said transistor while protecting said transistor from breaking down.

4,716,490

POWER SAVING MODULE

George Alexanian, 6138 N. Brooks Cir., Fresno, Calif. 93711

Filed Apr. 3, 1987, Ser. No. 33,622
Int. Cl.[4] H01H 47/04, 47/22
U.S. Cl. 361—155 5 Claims



1. A device for energizing a solenoid comprising:

a DC power source means,

normally closed switch means and means for connecting said switch means in series with a solenoid,

a first capacitor connected in parallel with said switch means and said solenoid when said solenoid is connected to said switch means,

resistance means connected to a terminal of said DC power source means and to a junction of said first capacitor and said switch means,

time delay means comprising a second capacitor connected in series with a relay coil across said DC power source means, said relay coil controlling said switch means,

wherein, upon application of power from said DC power source means, current flows through said second capacitor and said relay coil and thereby opens said switch means and current flows through said resistance means to charge said first capacitor, and

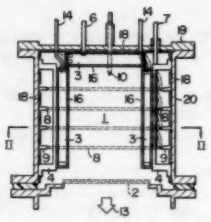
whereby upon charging of said second capacitor, and relay becomes de-energized and said switch means closes to permit, when said solenoid is connected to said switch means, an initial high current to flow from said first capacitor through said solenoid and thereafter permit a low-level holding current to flow from said DC power source means to said solenoid through said resistance means.

4,716,491

HIGH FREQUENCY PLASMA GENERATION APPARATUS

Yasunori Ohno; Tomoe Kurosawa, both of Hitachi; Tadashi Sato, Mito, and Youichi Ohshita, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 9, 1985, Ser. No. 806,341
Claims priority, application Japan, Dec. 11, 1984, 59-259884
Int. Cl.[4] H05H 1/16
U.S. Cl. 361—230 6 Claims



1. A high frequency plasma generation apparatus comprising:

cylindrical wall means;

means for hermetically sealing two ends of said cylindrical wall means, so as to form a high frequency plasma production chamber within said cylindrical wall means;

means for introducing a gas into said high frequency plasma production chamber;

a high frequency coil, disposed in said high frequency plasma production chamber in the neighborhood of said cylindrical wall means, for providing high frequency electric power to said gas so as to produce a plasma; and

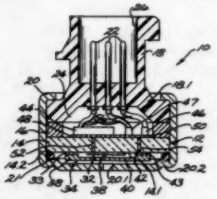
magnetic field generation means for generating a multi-cusp magnetic field for producing a plasma confinement domain inside of said high frequency coil, wherein said plasma is confined within said plasma confinement domain so as to prevent contact between said plasma and said high frequency coil.

4,716,492

PRESSURE SENSOR WITH IMPROVED CAPACITIVE PRESSURE TRANSDUCER

Thomas J. Charboneau, Plainville, and Keith W. Kawate, Attleboro Falls, both of Mass., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed May 5, 1986, Ser. No. 859,566
Int. Cl.[4] H01G 7/00; G01L 9/12
U.S. Cl. 361—283 24 Claims



1. A transducer comprising a substantially flat ceramic substrate having a flat surface on one side and having an opposite side, a first electrically conductive capacitor plate mounted on

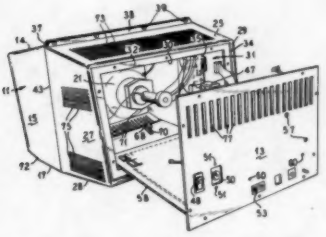
a central part of the flat surface on said one side of the flat, ceramic substrate, movable means mounted on said substrate surface at a location spaced to leave a peripheral portion of the flat ceramic substrate free to be engaged from each of two opposite sides of the flat ceramic substrate and having an electrically conductive surface portion of the movable means forming a second capacitor plate disposed over the first capacitor plate in selected spaced relation to the first capacitor plate to form a capacitor, and means for electrically connecting the first and second capacitor plates in an electrical circuit, the movable means being selectivly movable relative to the first capacitor plate for varying the capacitance of the capacitor in accordance with a selected change in condition being monitored while leaving the peripheral portion of said substrate accessible to be gripped at said two opposite sides of said peripheral portion of the flat ceramic substrate for mounting the transducer while leaving the movable means substantially free of stresses asociated with such mounting.

4,716,493

ELECTRONIC INSTRUMENT HOUSING

Philip Zelkowitz, 6518 N. Kilpatrick, Lincolnwood, Ill. 60646

Filed May 21, 1985, Ser. No. 736,236
Int. Cl.[4] H05K *7/20*
U.S. Cl. 361—383 **10 Claims**



1. A computer monitor console housing:
a cast aluminum casing having top, side and bottom walls defining a chamber receiving console apparatus and having a front end and a back end;
means mounting the console apparatus within said chamber;
said front end having an opening mounting a console apparatus CRT on said casing front end in a visibly exposed relation to said opening;
said back end having an access port through which said console apparatus within said chamber is accessible;
a replaceably removable closure for said access port;
means replaceably securing said closure in radiation leakproof joinder to said back end in closing relation to said access port;
said closure having means thereon supporting some console apparatus to be inserted and removed from said chamber on said closure serving as a carrier;
and said casing comprising a pair of shells, means securing said shells together, one of said shells having said front end opening, and the other of said shells having said back end access port, said other shell having a seat about said port receiving said closure.

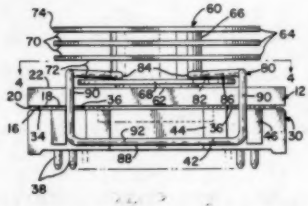
4,716,494

RETENTION SYSTEM FOR REMOVABLE HEAT SINK

Edward J. Bright, Elizabethtown, and David B. Sinisi, Harrisburg, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Nov. 7, 1986, Ser. No. 928,239
Int. Cl.[4] H05K *7/20*
U.S. Cl. 361—386 **14 Claims**

1. A retention system for securing a heat sink to an active device-containing means including a thermally conductive substrate having a substantially planar top surface and opposing side edges and further including a housing means having sidewalls, said system comprising:
a heat sink including a substrate-proximate surface engageable with the substrate upon assembly to said active device containing means to form a thermal connection, and further including a central shaft extending upwardly from said substrate-proximate surface and a retention fin extending radially outwardly from said central shaft proximate said substrate-proximate surface;
an integral formed wire spring clip having opposing horizontal inner sections arcuately shaped to conform to said central shaft and spaced apart to engage and hold said central shaft therebetween when said heat sink is inserted therebetween with said retention fin thereunder, said arcuate inner sections each having a reversed bend at each end thereof which bends are in opposed pairs from which intermediate sections extend outwardly in related pairs and are angled slightly upwardly, and outer sections joining outer ends of each said pair of intermediate sections and each having portions depending from said outer ends



joined by a horizontal latch member integral with said depending portions and disposed a selected distance lower than said arcuate inner sections, each said outer section cooperating with a respective opposing side wall of the housing means of the active device-containing means, said outer sections being spaced apart to be received along the opposing substrate side edges and the opposing side walls of the housing means; and
latching projections disposed on the respective opposing side walls of the housing means having downwardly facing latch surfaces latchingly engageable by respective said horizontal latch members upon assembly of said spring clip to the housing means, said latch surfaces located at a selected distance lower than the top surface of the substrate engageable by said heat sink, such that upon assembly when said heat sink engages the top substrate surface, said intermediate sections are resiliently deflected downwardly for said horizontal latch members to latch under said latch surfaces, thus generating downward spring force on said heat sink retention fin and creating an assured thermal connection between the top substrate surface and said substrate-proximate surface of said heat sink.

4,716,495

PRINTER CIRCUIT BOARD CHASSIS WITH POWER INTERLOCK

Robert Craker, Painesville, Ohio, assignor to Allen-Bradley Company, Inc., Milwaukee, Wis.

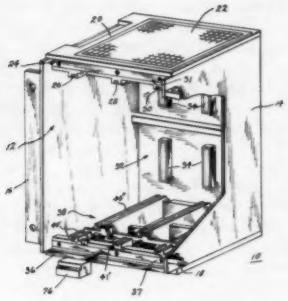
Filed Sep. 22, 1986, Ser. No. 909,710
Int. Cl.[4] H05K *7/14*
U.S. Cl. 361—391 **9 Claims**

1. A chassis having a plurality of locations for printed circuit boards, each location having at least one track for receiving an edge of a printed circuit board, said chassis including electrical connectors providing electrical interconnection of printed circuit boards inserted in said locations, the improvement comprising:
a printed circuit board retaining means for releasably hold-

ing a printed circuit board in each location, said retaining means having a held state and a released state;

a power supply including a printed circuit board inserted in one of said locations and coupled to one of the electrical connectors to supply electrical power to other electrical connectors of said chassis, and further including an electrical switch mounted on the printed circuit board, said switch having first and second states; and

means coupled to said retaining means for placing the switch in the first state when said retaining means is in the released state and for placing the switch in the second state when the retaining means is in the held state.



4,716,496

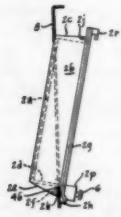
PANEL-MOUNTED CONTROL STATION HOUSING

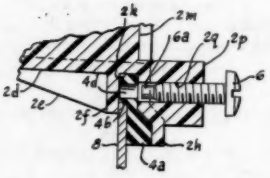
Ronald J. Fritsch, Sussex, Wis., assignor to Eaton Corporation, Cleveland, Ohio

Filed May 9, 1986, Ser. No. 861,168

Int. Cl.[4] H05K 7/00

U.S. Cl. 361—391 **14 Claims**





1. In a control station housing adapted for having electrical control apparatus mounted thereto comprising:

a substantially vertically oriented panel having an opening therein;

said housing having upper and lower transverse grooves open outwardly of said housing for receiving respective upper and lower edges of said panel opening, a vertical dimension between an outer edge of said upper groove and a corresponding edge of said lower groove being greater than a vertical dimension of said opening and a vertical dimension between bottoms of said respective grooves being less than said vertical dimension of said opening, said housing being insertable into said opening to engage said lower groove over said lower edge permitting rotation of an upper surface of said housing through said opening to align said upper groove with said upper edge;

resilient means in said lower groove biasing said housing upwardly to effect engagement of said upper groove with said upper edge; and

means carried by said housing extendable into said lower groove within said panel opening preventing downward movement of said housing within said opening sufficient to permit disengagement between said upper groove and said upper edge.

4,716,497

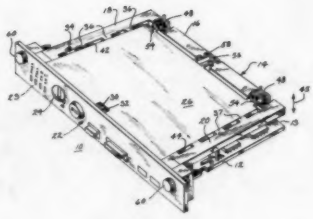
PRINTED CIRCUIT BOARD MODULE

Robert Craker, Painesville, Ohio, assignor to Allen-Bradley Company, Inc., Milwaukee, Wis.

Filed Sep. 22, 1986, Ser. No. 909,714

Int. Cl.[4] H05K 1/14

U.S. Cl. 361—395 **16 Claims**



1. A printed circuit board module comprising:

a first printed circuit board;

a frame substantially parallel to and spaced from said first printed circuit board, said frame having two opposed legs extending from a connecting member forming a central opening therebetween, each of said legs having an interior edge facing the other leg;

a frame insert removably held within the central opening of said frame; and

a second printed circuit board attached to said frame insert.

4,716,498

RACK MOUNTED CIRCUIT MODULE

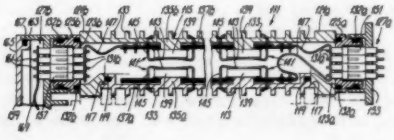
Stafford M. Ellis, East Preston, England, assignor to GEC Avionics Limited, England

Filed Nov. 12, 1985, Ser. No. 797,245

Claims priority, application United Kingdom, Nov. 23, 1984, 8429685; Mar. 29, 1985, 8508278

Int. Cl.[4] H05K 7/20

U.S. Cl. 361—386 **12 Claims**



1. A heat-dissipating electric circuit module, comprising:

(a) rectangular box including two parts of a material of a high thermal conductivity, each of said two box parts including a respective one of opposite external major

walls of the box and having an interior major surface and external surface portions;

(b) a first plurality of electrical components secured to, and mounted in good thermal contact with the interior major surface of, one of the box parts;

(c) a second plurality of electrical components secured to, and mounted in good thermal contact with the interior major surface of, the other of the box parts;

(d) each of said two box parts providing for the electrical components secured to its interior major surface a high thermal conductivity heat path extending to its external surface portions, whereby a major portion of heat generated in the electrical components during operation is conducted away from said components;

(e) each of at least some of said electrical components being mounted in surface contact with an inward facing surface of a respective pad portion of the said interior major surface of the said box part to which that component is secured; and

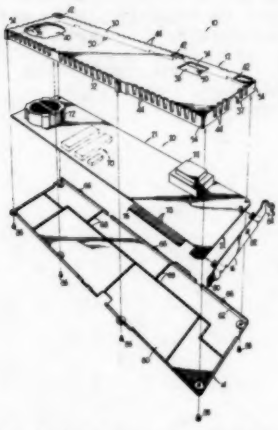
(f) a printed circuit board having a distribution of apertures corresponding to the distribution of pad portions located with a said box part with the pad portions received by said apertures of the board and the electrical components in contact with the pad portions electrically connected to tracks of the board.

4,716,499

ENCLOSED CIRCUIT BOARD ASSEMBLY

Vikram Bhargava, Alpharetta, Ga., assignor to Hayes Microcomputer Products, Inc., Norcross, Ga.

Filed Jul. 28, 1986, Ser. No. 889,739
Int. Cl.[4] H05K *7/12*
U.S. Cl. 361—395 **9 Claims**



1. An improved protective enclosure enclosing an electrical circuit board having a first and a second side, comprising:

a first cover at least partially concealing the first side and including a first engagement means extending over an edge of said circuit board, and engaging said second side;

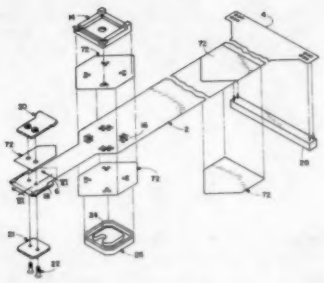
a second cover at least partially concealing said second side and including a second engagement means extending over an edge of said circuit board and engaging said first side, such that said first cover and said second cover means combine to at least partially enclose said circuit board.

4,716,500

PROBE CABLE ASSEMBLY

David G. Payne, Aloha, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Oct. 18, 1985, Ser. No. 789,278
Int. Cl.[4] H05K *1/00*
U.S. Cl. 361—398 **8 Claims**



1. A probe cable assembly for use in connecting a monitoring instrument to an electronic system under test, which system has a receptacle for receiving a multiple terminal electronic component, to analyze the interaction between the system and the component, said cable assembly comprising:

a flexible circuit cable having an instrument end for connection to the monitoring instrument and a probe end for connection to the receptacle of the electronic system under test, the cable having a plurality of conductors supported by a base sheet of dielectric material in mutually electrically insulated relationship with signal conductors and ground conductors being in interlaced relationship to form a plurality of transmission lines having a substantially uniform characteristic impedance over the length of the conductors, and having a cover sheet of dielectric material laminated to the base sheet with the conductors interposed between the cover sheet and the base sheet, at least one group of conductors terminating at the probe end in respective termination areas that lie in a predetermined array, the termination areas being exposed at one side of the cable and forming respective terminals for the conductors of said group;

a stiffening element attached to the cable at the probe end on the opposite side of the cable from said one side, said stiffening element being capable of fitting into the receptacle of the system under test; and

an auxiliary receptacle for receiving the multiple terminal electronic component, said auxiliary receptacle being secured to the cable and having a plurality of contact elements in a predetermined array, and also having terminal pins connected to the contact elements and extending through the base sheet and being connected to conductors to said one group.

4,716,501

INDICATOR LIGHT ASSEMBLY WITH FLUORESCENT LENS

John M. McKee, 3307 NW. 108 Dr., #15, and Joseph V. Ranalletta, 3893 NW. 73 Terr., both of Coral Springs, Fla. 33065

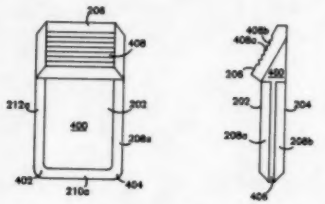
Filed Oct. 21, 1986, Ser. No. 921,295
Int. Cl.[4] F21V *7/04*
U.S. Cl. 362—31 **5 Claims**

1. An indicator light assembly, comprising in combination:

a translucent block having an index of refraction greater than that of the environment and including a fluorescent material, said block having two opposed and substantially parallel surfaces connected by a plurality of sides;

wherein one of said sides includes an indicating surface

positioned at an angle relative to said opposed surfaces whereby internal light traveling substantially parallel to said opposed surfaces is transmitted through said indicating surface; wherein another of said sides includes first and second reflecting surfaces positioned at angles relative to said opposed surfaces whereby internal light traveling substantially parallel to said opposed surfaces is reflected back into said block;



a printed circuit board having a first surface positioned adjacent one of said opposed surfaces of said translucent block, a second surface opposing said first surface, and a hole positioned over said block; and

a light source located on said second surface of said printed circuit board and positioned over said hole.

4,716,502

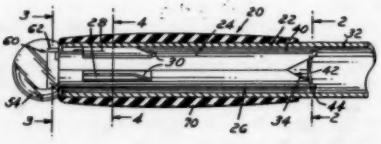
HANDLEBAR SAFETY LIGHT

Roger A. Schott, and Lawrence A. Schott, both of Redford, Mich., assignors to Freedom Industries, Inc., Redford, Mich.

Filed Nov. 7, 1986, Ser. No. 928,092

Int. Cl.[4] B62J *6/00*

U.S. Cl. 362—72 **13 Claims**



1. A signal light for bicycle and like applications having a handlebar with open tubular ends, said signal light comprising

a cylindrical battery shell having axially spaced ends, a circular opening at one end, and a circumferential array of spaced axially extending resilient ribs integrally projecting outwardly of said shell at angles thereto between said ends,

battery means captured within said shell so as to position battery contacts adjacent to said spaced ends of said shell,

a lamp having a base received in said circular shell opening and a bulb carried by said base externally of said shell, and

a lens having a hollow contoured head affixed to said shell at said one end enclosing and capturing said bulb,

said ribs being of identical construction and having axial edges spaced from said one shell end which slope rearwardly toward said shell so as to facilitate press-fit insertion of said shell into a handlebar end,

said ribs being of radially inwardly concave arcuate cross section of uniform thickness axially of said shell and having radii of curvature equal to that of said shell,

said ribs having an outer diameter for resilient press-fit insertion of said shell into a handlebar end such that said ribs function both to retain said shell in the handlebar end, to center in said shell therein, and to adapt to various size openings in the handlebars.

4,716,503

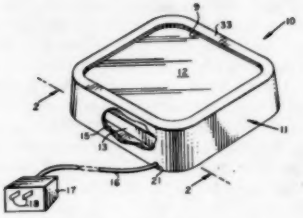
FLUORESCENT DISPLAY BASE

Richard L. Chappell, and Alice M. Chappell, both of New York, N.Y., assignors to Fine Lines International Ltd., New York, N.Y.

Filed Sep. 20, 1984, Ser. No. 652,202

Int. Cl.[4] F21S *3/00*; G09G *13/04*

U.S. Cl. 362—97 **12 Claims**



1. A low-intensity fluorescent light display stand for supporting and illuminating sculptures and art objects comprising a case, said case having side walls, said case having an open bottom and an open top, said open top including an inward flange, a translucent plastic top portion for supporting and illuminating sculptures and art objects, said translucent top portion integrally attached to said open top portion of said case at said flange, a bottom portion, said bottom portion adapted to be engageably held in said open bottom of said case, said bottom portion adapted to mount at least one fluorescent tube, a fluorescent starter disposed in said case and connected in series to a 120 volt AC-DC step-down transformer having means adapted to connect to a standard 120 volt outlet remote from said case, a low voltage DC-AC step-up transformer disposed inside said case and connected to said starter and to said AC-DC step-down transformer, said DC-AC step-up transformer connected in parallel to said fluorescent tube.

4,716,504

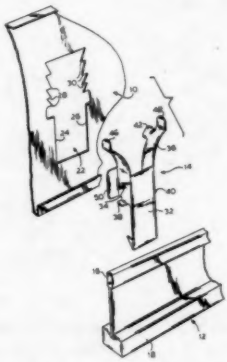
LIGHT FIXTURE BRACKET FOR SUSPENDED CEILING

Scott Pahl, North Andover, and Luigi De Simone, Chelsea, both of Mass., assignors to Keene Corporation, Union, N.J.

Filed Mar. 13, 1987, Ser. No. 25,496

Int. Cl.[4] F21S *1/02*

U.S. Cl. 362—150 **8 Claims**



1. In combination, a light fixture having a sidewall with a bracket engaging opening therein, said opening being defined with a plurality of vertically spaced bracket engaging means arranged in pairs therein, and a bracket for securing said fixture to a ceiling grid member; said bracket including:

a vertical plate;

a pair of spaced legs extending from said plate disposed

transverse to said plate along opposite sides thereof, said legs being biased away from each other;

fixture engaging means on each of said legs adapted to interengage with said bracket engaging opening, said fixture engaging means becoming disengaged when said legs are urged towards one another; and,

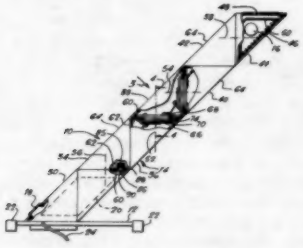
feet members on each of said legs spaced downwardly of said fixture engaging means and adapted to rest on a top surface of said grid member, the vertical position of said fixture with respect to said grid member being determined by which of said pairs of bracket engaging means interengages with said fixture engaging means.

4,716,505

TABLE LAMPS

Shui L. D. Chan, Kowloon, Hong Kong, assignor to New Horizons Product Development Company Limited, Hong Kong

Filed Feb. 13, 1987, Ser. No. 14,632
Int. Cl.[4] F21S *1/02*
U.S. Cl. 362—287 **9 Claims**



1. A table lamp comprising:

a base,

an arm upstanding from said base and having an inner end joined to said base and an outer end, said arm being constituted by a number of hollow box-like segments,

bearing means rotatably joining adjacent segments to one another so that adjacent segments are capable of rotation one relative the other, a lamp supported in the segment at said outer end of said arm, said lamp being arranged to provide illumination when energised,

an electrical supply cord leading to said base, commutator means aligned with said bearing means between each adjacent pair of segments for passing electrical current from one segment to an adjacent segment,

conductor means in each segment for passing electrical current from commutator means to commutator means,

said lamp being connected to said commutator means from said segment at said outer end of said arm and said supply cord being connected to commutator means for a segment at said inner end of said arm.

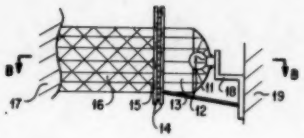
4,716,506

IRIS-PRODUCING LAMP DEVICE

Hui C. Shang, Room No. 330, Gate No. 2, Building No. 6 ZaoLinXiLi, XuanWu District, Beijing, China

Filed Sep. 15, 1986, Ser. No. 907,242
Claims priority, application China, Sep. 16, 1985, 85203803
Int. Cl.[4] F21V *9/00*
U.S. Cl. 362—293 **7 Claims**

1. An iris-producing lamp device comprising one or more non-monochromatic light sources with its socket or their sockets on a bracket wherein a lamp shade also mounted on said bracket is made of a grating-film iris-producing glass, and wherein the grating-film iris-producing glass is made of a 2-dimensional grating-film or two 1-dimensional grating-films with one superimposed on the other crossedly and they are all



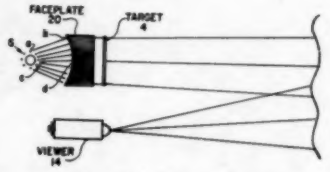
clamped firmly between two sheets of transparent material or affixed on one sheet of the transparent material.

4,716,507

OPTICAL COLLIMATOR TARGET ILLUMINATION

Alan J. Ames, Casselberry, Fla., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed May 12, 1986, Ser. No. 862,903
Int. Cl.[4] F21V *8/00*
U.S. Cl. 362—311 **2 Claims**



1. In a collimator including a target illuminated by a light source positioned adjacent thereto with its axis through the centerpoint of the target, the off-axis illumination of the target being lower than illumination at the light axis by an amount proportional to the fourth power of cosine of the angle at which light strikes the periphery, means for obtaining uniform illumination across the target with increased illumination at its periphery comprising a fiber optic faceplate positioned between the light source and the target, the faceplate being a coherent fiber optic bundle, the bundle being disposed with its longitudinal axis lying on the target axis, the bundle having a concave end so that a curved surface is adjacent the light source, the curvature of the curved surface being such that the distance from the light source to off-axis fibers in the bundle is equal to the distance from the light source to a fiber on the light axis, overcoming the cosine fourth power illumination lowering effect.

4,716,508

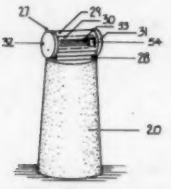
OUTDOOR LIGHTING PEDESTAL

John F. Kramer, deceased, late of Palm Desert, Calif.; by Barbara B. Van Oosting, executrix, P.O. Box 2857, Palm Desert, Calif. 92261, and by Karen S. Wessberg, executrix, 2469 Porthmoor, Corona, Calif. 91720

Filed Oct. 28, 1985, Ser. No. 791,928
Int. Cl.[4] F21S *1/10*
U.S. Cl. 362—431 **6 Claims**

1. A pedestal for supporting an electric lighting fixture which comprises an upright member formed of a dense composition having a central base for accommodation of electrical wiring extending centrally therethrough, said pedestal being in the form of a frustum of a cone with a wide base adapted to rest upon the ground and an uppermost narrow surface adapted to receive said lighting fixture wherein a vertically slidable sup-

porting collar is positioned around said pedestal at a level at which its base is supported upon the ground, a central opening



in said collar conforming closely to an outer diameter of the pedestal at said level.

4,716,509

PWM INVERTER WITH TRAPEZOIDAL OUTPUT

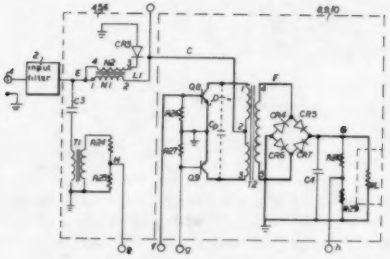
Silvio Roccucci, Rome, Italy, assignor to Selenia Spazio, L'Aquila, Italy

Filed Feb. 27, 1986, Ser. No. 834,306

Claims priority, application Italy, Feb. 28, 1985, 47752 A/85

Int. Cl.[4] H02M *3/337*

U.S. Cl. 363—26 **3 Claims**



1. A pulse-width-modulated inverter-converter for generating a output from a direct-current supply voltage, comprising:

a source of said direct-current supply voltage;

a power inverter connected to said source and provided with a power transformer;

a pair of transistors each having a respective emitter-collector network connected between a respective end of a primary winding of said transformer and ground, said power transformer having a secondary winding, a signal applied to said primary winding being controlled so that a smoothed trapezoidal waveform is outputted by said transformer;

a full-wave rectifier connected across said secondary winding and receiving said smoothed trapezoidal waveform therefrom for applying said output to said load;

a main oscillator connected to said source and generating from said direct-current supply voltage a substantially square wave signal adapted to determine the frequency of said power output;

means connecting said main oscillator to said power inverter for generating said power output therein; and

means including a nonlinear inductive element responsive to current drawn therethrough and interposed between said source and said power inverter for sending constant current energy to said power transformer and the load, wherein said nonlinear inductive element includes:

a reactor having one winding connected in series between an input filter connected to said source and a centertap of said primary winding of said transformer, and said reactor having another winding, said other winding is of opposite polarity from said one winding and is connected in series with an output of said filter,

a nonlinear diode having an anode connected to ground and a cathode connected to said other winding, and

a filter and recovery capacitor connected upstream of said reactor, said nonlinear diode acting as an energy recovery element toward said filter and recovery capacitor.

4,716,510

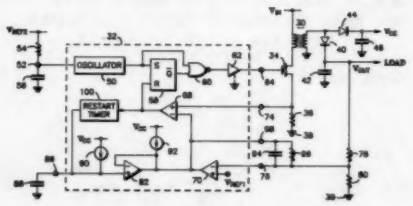
AUTOMATIC RESTART CIRCUIT FOR A SWITCHING POWER SUPPLY

W. David Pace, Tempe, and Wei C. Wang, Mesa, both of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed May 5, 1986, Ser. No. 859,690

Int. Cl.[4] H02M *7/517*

U.S. Cl. 363—49 **2 Claims**



1. In a pulse width modulation controller including modulator circuitry for providing output pulses at an output thereof to utilization means, the modulator circuitry including a comparator and an error amplifier operating in conjunction to provide output pulse width modulation by causing the output of the comparator to periodically switch from a first level state to a second level state and soft start circuitry coupled with the comparator for providing slow start up of the controller, the soft start circuitry including a first capacitor, the improvement comprising circuit means coupled between the output of the comparator and the soft start circuitry for activating the soft start circuitry to initiate a restart of the controller whenever the output of the comparator does not switch to the second level state within a preset time interval wherein said circuit means includes;

a second capacitor;

means for charging said second capacitor;

first semiconductor switch means responsive to the output of the comparator output being switched to said second level state for discharging said second capacitor; and

second semiconductor switch means responsive to said second capacitor being charged to a predetermined level when the output of the comparator does not switch within said preset time interval for discharging the first capacitor whereby the restart of the controller is initiated.

4,716,511

SURGE CURRENT-LIMITING CIRCUIT

Kazumi Masaki, Osaka, Japan, assignor to Ken Hayashibara, Okayama, Japan

Filed Jun. 12, 1986, Ser. No. 874,017

Claims priority, application Japan, Jun. 28, 1985, 60-140156

Int. Cl.[4] H02H *9/00;* **H05B** *41/36*

U.S. Cl. 363—49 **6 Claims**

1. A circuit for limiting surge current, consisting essentially of:

(a) an AC power source connected in series with a switch;

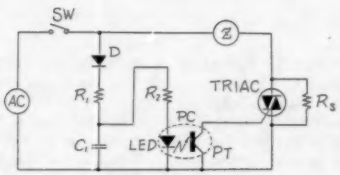
(b) a current-limiting means connected in series with a load and said AC power source and switch;

(c) a control rectifier connected in parallel with the current-limiting means, said rectifier having a gate for its control;

(d) a photocoupler connected with said gate of said controlled rectifier; and

(e) a delay circuit having a time constant, connected in parallel with said AC power source and said switch, said delay circuit also being connected in parallel with said series circuit of said load and current-limiting means and further connected through the photocoupler with said gate of the controlled rectifier;

wherein said current-limiting means is effectively short-circuited by said controlled rectifier being turned from the



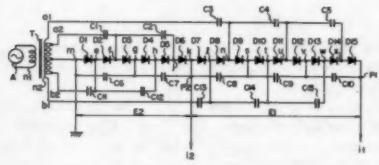
non-conducting state to the conducting state by said delay circuit via said photocoupler, after a period of time corresponding to said delay time after the closing of said switch, said photocoupler transmitting an amount of light which increases over said period corresponding to said time constant, for providing a respective gate signal to said gate of said controlled rectifier for said change of state thereof.

4,716,512

MULTIPLE STEP-UP RECTIFIER CIRCUIT

Yoshio Takamura, and Akira Nakajima, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 4, 1986, Ser. No. 903,425
Claims priority, application Japan, Sep. 10, 1985, 60-198507
Int. Cl.[4] H02M 7/25
U.S. Cl. 363—61 **9 Claims**



1. A multiple step-up rectifier circuit, comprising:

first input terminals (A1, B1) between which a first voltage is applied;

second input terminals (A2, B2) between which a second voltage different from said first voltage is applied;

a reference potential point provided between said first input terminals and between said second input terminals, the polarity of said first voltage applied to one (A1) of said first input terminals being opposite to that of said first voltage applied to the other first input terminal (B1) with respect to said reference potential point, and the polarity of said second voltage applied to one (A2) of said second input terminals being opposite to that of said second voltage applied to the other second input terminal (B2) with respect to said reference potential point;

a plurality of rectifier elements connected in series to provide a rectifier series circuit and have the same rectifying direction, one end of said rectifier series circuit being connected to said reference potential point;

a plurality of first capacitors connected in series to provide a capacitor series circuit having two ends connected to the respective ends of said rectifier series circuit, each first capacitor being connected in parallel to two or more of said first rectifier elements;

a first output terminal provided at that end of said capacitor series circuit which is connected to the other end of said rectifier series circuit;

a second output terminal provided at a connection point between arbitrary, adjacent two of said first capacitors;

second capacitors grouped into first and second second capacitor groups, said first second capacitor group including at least one of said second capacitors, and having two ends, one of which is connected to said one (A1) of said first input terminals while the other end of said first second capacitor group is connected to a connection point between arbitrary, adjacent two of said rectifier elements, which is located between said first and second output terminals, said second second capacitor group including at least one of said second capacitors, and having two ends, one of which is connected to said other first input terminal (B1) while the other end of said second second capacitor group is connected to a connection point between arbitrary, adjacent two of said rectifier elements, which is located between said first and second output terminals and is different from said connection point where said other end of said first second capacitor group is connected;

third capacitors grouped into first and second third capacitor groups, said first third capacitor group including at least one of said third capacitors, and having two ends, one of which is connected to said one (A2) of said second input terminals while the other end of said first third capacitor group is connected to a connection point between arbitrary, adjacent two of said rectifier elements, which is located between said second output terminal and said reference potential point or connected to a connection point between arbitrary, adjacent two of said rectifier elements, which is located between said second output terminal and a third output terminal located closer to said reference potential point than said second output terminal, said second third capacitor group including at least one of said third capacitors, and having two ends, one of which is connected to said other second input terminal (B2) while the other end of said second third capacitor group is connected to a connection point between arbitrary, adjacent two of said rectifier elements, which is located between said second output terminal and said reference potential point or a connection point between arbitrary, adjacent two of said rectifier elements, which is different from said connection point where said other end of said first third capacitor group is connected;

said second and third capacitors having the following relationship:

$$\frac{C_1}{C_2} = \frac{\frac{1}{3}n_1^2 + n_1 + \frac{1}{3}}{\frac{1}{3}n_2^2 + n_2 + \frac{1}{3}} \times \frac{I_1}{I_2} \times \frac{E_2}{E_1}$$

where

C_1: capacitance of each of said second capacitors,

C_2: capacitance of each of said third capacitors,

n_1: half the number of said second capacitors,

n_2: half the number of said third capacitors,

I_1: output current of said first output terminal,

I_2: output current of said second output terminal,

E_1: first voltage applied between said first input terminals, and

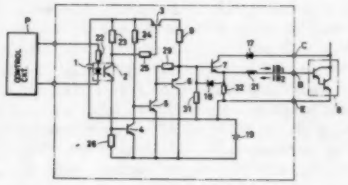
E_2: second voltage applied between said second input terminals.

4,716,513

BASE DRIVE CIRCUIT IN A TRANSISTOR INVERTER

Tomotaka Ito, Aichi, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 28, 1986, Ser. No. 890,047
Claims priority, application Japan, Jul. 30, 1985, 60-168111
Int. Cl.[4] H02M 7/44
U.S. Cl. 363—97 2 Claims



1. A base drive circuit in a transistor inverter in which a transistor on-off operation is utilized to convert a DC voltage into an AC voltage, comprising:

a main circuit transistor having a base;

a control circuit for controlling a direction of current through said main circuit transistor;

a photocoupler having a rear stage and being rendered on and off by a pulse signal outputted by said control circuit;

first transistor means (7), coupled to said photocoupler, for supplying base current to said main circuit transistor when said photocoupler is on;

an amplifying transistor (5) at the rear stage of said photocoupler;

second transistor means (6), directly driven by an output of said amplifying transistor when said photocoupler is off, for applying a reverse bias current to the base of said main circuit transistor; and

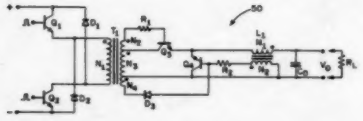
conductor means, directly connected between said amplifying transistor and said second transistor means, for directly applying said output to said second transistor means.

4,716,514

SYNCHRONOUS POWER RECTIFIER

Raoji Patel, Framingham, Mass., assignor to Unitrode Corporation, Lexington, Mass.

Continuation of Ser. No. 681,016, Dec. 13, 1984, abandoned. This application Sep. 22, 1986, Ser. No. 910,313
Int. Cl.[4] H02M 7/217
U.S. Cl. 363—127 6 Claims



1. A synchronous power rectifier comprising:

a source providing a flow of current at periodic intervals;

a first semiconductor device comprising a bipolar transistor connected to receive said flow of current from said source and being synchronously controlled by said source to pass said flow of current of one polarity during said period intervals;

a capacitor;

an inductor connected to said source and said capacitor to receive said flow of current and provide a charging current for said capacitor;

a second semiconductor device connected to provide a second flow of current of said polarity from said inductor into said capacitor during time intervals wherein said first semiconductor device is not providing flow of current from said source wherein,

said conductor includes a secondary winding connected to cause said second semiconductor device to provide said second flow of current, and

said source provides a turn-off signal at periodic intervals, said synchronous power rectifier further comprising

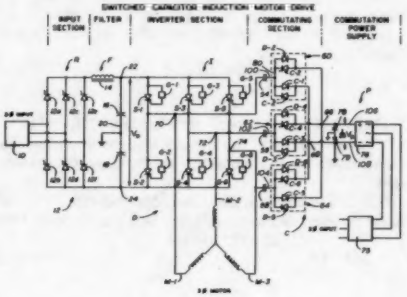
means to apply said turn-off signal to said second semiconductor element to cause it to turn off.

4,716,515

SWITCHED CAPACITOR INDUCTION MOTOR DRIVE

William C. Alexander, Austin, Tex., assignor to Solar Refining, Inc., Austin, Tex.

Continuation-in-part of Ser. No. 616,832, Jun. 4, 1984, Pat. No. 4,597,039, which is a continuation-in-part of Ser. No. 534,567, Sep. 22, 1983, abandoned. This application Jun. 18, 1986, Ser. No. 875,636
The portion of the term of this patent subsequent to Jun. 24, 2003, has been disclaimed.
Int. Cl.[4] H02M 7/515
U.S. Cl. 363—138 10 Claims



1. An alternating current, induction motor drive, for providing alternating drive current from a direct current voltage source, comprising:

a plurality of gate control motor drive switching elements forming a three-phase motor drive inverter circuit, said inverter circuit being connected between the voltage source and the motor;

switch control means for controlling said motor drive switching elements in timed relation so as to provide the three-phase drive current to the motor, said switch control means including voltage sensing means for preventing said switching elements from being actuated unless the voltage across said switching elements is less than a prescribed minimum value or an increasing value, said switch control means comprising:

means for selectively applying reverse bias voltage to said gate control switching elements to force-commutate said switching elements in timed relation so as to provide three-phase drive current to the motor; and

gate control means for selectively enabling said gate controlled switching elements in a timed relation so as to provide three-phase drive current to the motor; and

a plurality of capacitive buffering means having a first terminal and a second terminal, said first terminal being connected between said switching elements in each phase of said inverter circuit and said second terminal being connected to said force-commutation means, said capacitive buffering means being selected to have an energy storage capacity slightly less than the energy storage capacity of the motor,

wherein said reverse bias means for selectively applying reverse bias voltage comprises saturable reactor means for

selectively applying reverse bias voltage to said gate control switching element.

4,716,516

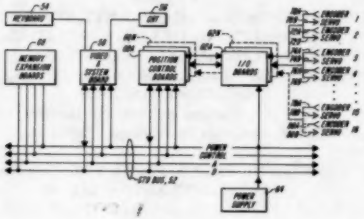
MODULAR MACHINE TOOL CONTROLLER

Ronald X. DuLong, Sandown, N.H., assignor to Dynamics Research Corporation, Wilmington, Mass.

Filed Sep. 26, 1984, Ser. No. 654,778

Int. Cl.[4] G06F *15/00*

U.S. Cl. 364—132 **3 Claims**



1. A modular machine tool controller, comprising:

means for receiving and storing user commands and providing control instructions;

position control means for receiving said control instructions and providing position signals to said machine tool and having an instruction cycle; and

data transfer means for selectively providing block control instruction transfer between said means for receiving and said position control means, wherein

said position control means is operable according to a predetermined address to temporarily inhibit said means for receiving until said position control instruction cycle is complete and thereafter permitting operation of said data transfer means,

additional position control means are operable at a corresponding address, said additional position control means also receiving control instructions on said data transfer means and having a different corresponding address,

said additional position control means includes:

a processor;

processor interrupt means; and

control instruction input means, and wherein

upon completion of the position control cycles, said processor interrupt means is operative to inhibit operation of said processor and to cause new control instructions to be received by said control instruction input means, whereupon said processor is released to provide position signals according to said control instructions in said control instruction input means.

4,716,517

APPARATUS FOR CONTROLLING AN ELEVATOR

Shigemi Iwata, Aichi, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Sep. 11, 1985, Ser. No. 774,886

Int. Cl.[4] B66B *3/02*

U.S. Cl. 364—148 **7 Claims**

1. In an apparatus for controlling an elevator cage moving in a hoistway between a plurality of floors, the combination comprising:

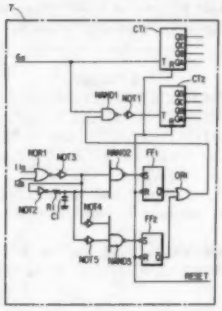
a pulse generating means for generating signal pulses responsive to vertical movement of the cage in the hoistway,

a plurality of plates provided in the hoistway, each plate corresponding to one of the floors,

position detector means including detectors provided on the cage and movable upon movement of the cage into positions opposite to said plates for detecting the positions of the floors corresponding to said plates based on the positions of the cage and for generating position signals representing a predetermined point located a predetermined distance above each actual floor level and a predetermined point located a predetermined distance below each actual floor level,

memory means for storing data representing the positions of the cage and the floors,

first means for calculating the positions of the predetermined points on the basis of number of pulses generated from



said pulse generating means and accumulated when a signal representing a predetermined point above a floor and a predetermined point below a floor is generated, and for storing data in said memory means representing the calculated positions of the predetermined points, and

second means for calculating data as to the actual levels of the respective floors on the basis of the calculated positions of the predetermined points and storing the data as to calculated actual floor levels in said memory means.

4,716,518

INCREMENTAL CONTROL

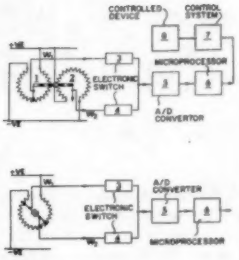
Nicholas J. Hawkins, Cambridgeshire, and Robert Saltarelli, Suffolk, both of England, assignors to W. Vinten Limited, Suffolk, England

Filed Nov. 14, 1985, Ser. No. 798,065

Claims priority, application United Kingdom, Nov. 14, 1984, 8428806

Int. Cl.[4] G05D *3/00*

U.S. Cl. 364—184 **16 Claims**



1. An endstopless incremental control arrangement comprising:

at least two variable output devices connected in parallel across a voltage supply, said variable output devices each including an output member which is variable in position to vary the output of the associated device;

means for ganging said output members together so that there is a predetermined relationship between the posi-

tions of the output members relative to the corresponding variable output devices;

a selector switching means connected in series with the output member of each of said variable output devices;

conversion means connected to the outputs of said switching means for providing a digital output in accordance with the outputs for said switching means; and

processing means, connected to said conversion means, for processing said digital output so as to determine which of the variable output devices is producing the most valid output and for producing an output signal corresponding to the said most valid output for use in a control system.

4,716,519

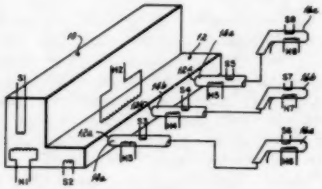
METHOD OF CHECKING CHANNEL CONNECTIONS AND DETECTING HEATER CIRCUIT AND TEMPERATURE SENSOR MALFUNCTIONS IN MULTI-CHANNEL CLOSED LOOP HOT MELT HEATING SYSTEMS

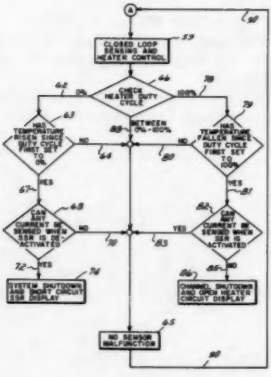
Philip F. Locke, Jr., Mentor, and Mark J. Ignatius, Lakewood, both of Ohio, assignors to Nordson Corporation, Amherst, Ohio

Filed Jan. 22, 1986, Ser. No. 821,005

Int. Cl.[4] F25B *13/00*; G10M *19/00*; G05D *23/00*

U.S. Cl. 364—186 **10 Claims**





1. For use in connection with a multi-component hot melt heating system wherein each component has an electric heater energized through a signal-controlled switch having a control electrode and an associated temperature sensor, and wherein the components are each connected to a different channel of a multi-channel microprocessor for individual closed loop temperature control of each component, a method of checking each channel to determine the component status thereof, comprising the steps of:

(a) checking the control signals to the control electrodes of the signal-controlled switches of all channels to determine if all are at switch-deactivation levels designed to render nonconductive their associated signal-controlled switches, reflecting all sensor temperatures being above their respective set point temperatures;

(b) when all control signals are at switch deactivation levels, determining for a sensor associated with a single channel to be checked if the temperature thereof has risen since the time the control signal level input to its associated signal-controlled switch most recently switched to its present switch-deactivation level; and

(c) in response to detecting a nonincreasing sensor temperature in step (b), providing a normal sensor indication.

4,716,520

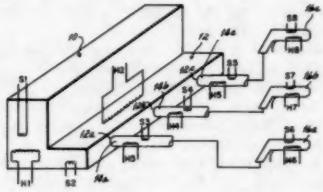
METHOD OF CHECKING CHANNEL CONNECTIONS AND DETECTING HEATER CIRCUIT AND TEMPERATURE SENSOR MALFUNCTIONS IN MULTI-CHANNEL CLOSED LOOP HOT MELT HEATING SYSTEMS

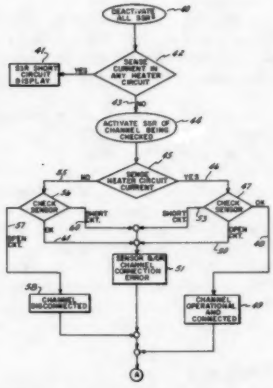
Philip F. Locke, Jr., Mentor, and Mark J. Ignatius, Lakewood, both of Ohio, assignors to Nordson Corporation, Amherst, Ohio

Division of Ser. No. 821,005, Jan. 22, 1986. This application Mar. 16, 1987, Ser. No. 26,014

Int. Cl.[4] F25B *13/00*; G10M *19/00*; G05D *23/00*

U.S. Cl. 364—186 **8 Claims**





1. For use in connection with a multi-component hot melt heating system wherein each component has an electric heater energized through a signal-controlled switch having a control electrode and an associated temperature sensor, and wherein the components are each connected to a different channel of a multi-channel microprocessor for individual closed loop temperature control of each component, a method of checking each channel to determine the component status thereof, comprising the steps of:

(a) providing control signals to the control electrode output lines of each microcomputer channel to render nonconductive any signal-controlled switches having their respective control electrode connected to the input of a channel;

(b) sensing the current flow through the heaters with a

current sensor common to all heater energization circuits and providing a short circuited switch indication if significant current flow exists;

(c) providing control signals to the control electrode output line of a specific individual channel to be checked to render conductive the signal-controlled switch having its control electrode connected thereto;

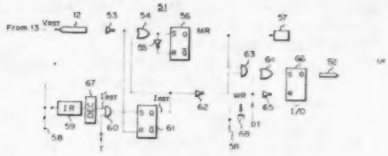
(d) sensing heater current flow with a current sensor common to all heater energization circuits; and

(e) in response to significant sensed heater current flow in step (d), checking the temperature sensor connected to the specific individual channel being checked, and if it is neither open circuited nor short circuited, providing an indication that a fully operational component is connected to the specific channel being checked.

4,716,521
MICROCOMPUTER

Yasutaka Nagae, Kawasaki, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Jul. 12, 1984, Ser. No. 630,239
Claims priority, application Japan, Jul. 13, 1983, 58-126241
Int. Cl.[4] G06F 1/00
U.S. Cl. 364—200 **7 Claims**



1. A microcomputer which executes instructions to produce output data, operatively connected to a first external pin for receiving an external reset signal to initialize said microcomputer and a second external pin for providing a power-on signal to hold said microcomputer in a power-on state, said microcomputer comprising:

an instruction decoder, operatively connected to receive instructions, capable of decoding a reset instruction and outputting a control signal in response to the reset instruction; and

internal reset signal means, operatively connected to said instruction decoder, for generating an internal reset signal in response to the control signal, said microcomputer being initialized by the internal reset signal, said internal reset signal means comprising:

a first flip-flop, operatively connected to said instruction decoder, for maintaining the internal reset signal as an output; and

a first OR gate operatively connected to said first flip-flop and the first external pin to receive the external reset signal;

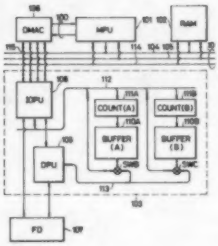
microcomputer elements operatively connected to said internal reset signal means; and

a master reset flip-flop, operatively connected to said first OR gate and said microcomputer elements, for producing a master reset signal for initializing said microcomputer elements.

4,716,522
MICROCOMPUTER SYSTEM WITH BUFFER IN PERIPHERAL STORAGE CONTROL

Tsuneo Funabashi, Hachioji; Kazuhiko Iwasaki, Kokubunji, and Hideo Nakamura, Nishitama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 10, 1983, Ser. No. 473,861
Claims priority, application Japan, Mar. 10, 1982, 57-36408
Int. Cl.[4] G06F 3/06
U.S. Cl. 364—200 **5 Claims**



1. In a microcomputer system including a data processor; a random access memory; a common bus interconnecting said data processor and said random access memory; and a peripheral disc storage unit in which data is stored on a disc in sectors having a predetermined number of data blocks; a peripheral storage control for controlling data transfer between said peripheral disc storage unit and said random access memory under control of said data processor, comprising:

an internal data bus;

counter means connected to said internal data bus for storing memory addresses;

buffer means connected to said counter means for storing a sector of data read out from said peripheral disc storage unit into, and for feeding a number of data blocks which may be less than that of a sector of data to said internal data bus from, a storage location thereof having an address corresponding to that stored in said counter means;

switching means selectively connecting said buffer means to said internal data bus or said peripheral storage;

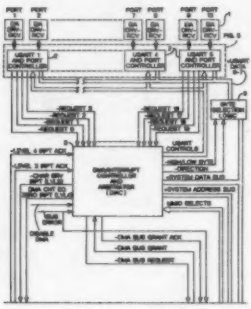
data transfer means connected between said internal data bus and said common bus and connected to receive a transfer acknowledge signal from said data processor for controlling the direction of data transfer between said internal data bus and said common bus in response to both a read/-write instruction signal received on said common bus and said transfer acknowledge signal from said data processor; and

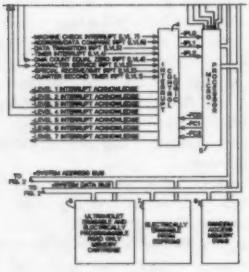
control means connected to said internal data bus and responsive to a predetermined command transferred to said internal data bus by said data transfer means for controlling said switching means, said counter means and said buffer means to effect connection between said buffer means and said peripheral disc storage unit to cause data transfer therebetween and to effect connection between said buffer means and said internal data bus to cause data transfer with said random access memory via said data transfer means and said common bus, including storing means for storing an indication of a number of blocks to be transferred and a read start address received from said data processor via said common bus and said data transfer means, means for setting said counter means with said read start address associated with said predetermined command and means for controlling said buffer means to read out a number of blocks of data, beginning at said read start address according to the data stored in said storing means.

4,716,523
MULTIPLE PORT INTEGRATED DMA AND INTERRUPT CONTROLLER AND ARBITRATOR

Gilbert S. Burrus, Jr., Apex; Ronald J. Cooper, Raleigh; Michael R. Marr; John C. Pescatore, both of Chapel Hill, and Mario A. Marsico, Cary, all of N.C., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 14, 1985, Ser. No. 744,852
Int. Cl.[4] G06F *13/32*
U.S. Cl. 364—200 17 Claims





1. A multi-port communications system data transfer service combined interrupt request/DMA request arbitrator, direct memory access controller and interrupt driven access controller for a bus inter-connected processor and memory system providing communications services, comprising:

a communications port service request arbitration means connected to a plurality of communications ports and receiving therefrom a plurality of contemporaneous interrupt and/or DMA requests for data transfer service, said arbitration means having a means for identifying the highest priority service request from among said contemporaneous requests and means for issuing a channel identification therefor;

a direct memory access control means connected to said arbitration means for receiving said channel identification and responsive thereto for issuing a direct memory access bus request to said processor; and

a data buffer and a state control logic means, said state control logic means being connected to said processor and responsive to a receipt from said processor of a bus grant signal for causing issuance from said buffer to said processor of a direct memory access address identifying the memory location for reading or writing data; and

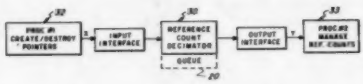
an interrupt control means connected for receiving said channel identification from said arbitration means and responsive thereto for issuing interrupt signals to said processor; and

said interrupt control means being responsive to the receipt of an interrupt acknowledgement signal from said processor for issuing a memory address vector for locating the start of an interrupt program for handling said interrupt.

4,716,524
APPARATUS AND METHOD REMOVING INCREMENT/DECREMENT PAIRS TO DECIMATE A BLOCK REFERENCE STREAM

Donald W. Oxley, Carrollton; David H. Bartley, and Timothy J. McEntee, both of Dallas, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Apr. 4, 1985, Ser. No. 719,778
Int. Cl.[4] G06F *1/00*
U.S. Cl. 364—200 32 Claims



1. Apparatus for removing increment/decrement pairs, in a computer system of a type in which a count of pointers which reference blocks of memory is incremented and decremented, comprising:

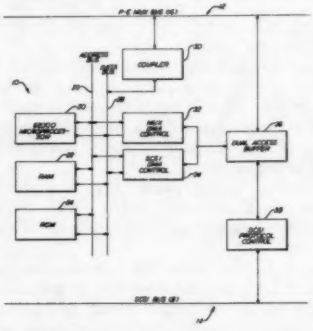
means for determining an occurrence of a reference count increment/decrement pair;

and means connected to said determining means for decimating the referecne count by deleting the determined increment/decrement pair.

4,716,525
PERIPHERAL CONTROLLER FOR COUPLING DATA BUSES HAVING DIFFERENT PROTOCOL AND TRANSFER RATES

Robert A. Gilanyi, Long Branch, and Ralph H. Schmitt, Manalapan, both of N.J., assignors to Concurrent Computer Corporation, Holmdel, N.J.

Filed Apr. 15, 1985, Ser. No. 723,246
Int. Cl.[4] G06F *13/12*
U.S. Cl. 364—200 3 Claims



1. A peripheral controller for coupling devices coupled to a first data bus having a unique bus protocol and data transfer signals to devices coupled to a second data bus having a different protocol and data transfer rate, the controller comprising, in combination:

a system clock producing interleaved clock signals for a first state and for a second state;

a dual access buffer including a plurality of locations in a plurality of pages to access a location in a first page during said first state and to access a location in a second page during said second state;

first address defining means for providing a signal indicating a location in said first page;

second address defining means for providing a signal indicating a location in said second page;

first data coupling means, responsive to said clock signals and to said first page indicating signal, for coupling and transferring data between said first data bus and said buffer at said location in said first page during said first state;

an intermediate register comprising separate portions coupled to said buffer, all portions taken together having the same number of data bits as each accessible location in said buffer;

means, responsive to said clock signals and to said second page indicating signal, for coupling said intermediate register to said buffer at said location in said second page to transfer data from said intermediate register to said buffer during said second state;

second data coupling means for coupling said intermediate register to said second data bus to transfer data between separate portions of said intermediate register and said second data bus, said second data coupling means for gating data between all portions of said intermediate register and said second data bus.

4,716,526

MULTIPROCESSOR SYSTEM

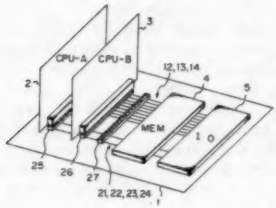
Shosuke Mori, Tokyo; Atsushi Sakurai, Fuchu; Satoshi Aoki, and Tatsuya Suzuki, both of Tokyo, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Jun. 20, 1984, Ser. No. 622,455

Claims priority, application Japan, Jun. 29, 1983, 58-115885

Int. Cl.[4] G06F *15/16*

U.S. Cl. 364—200 **11 Claims**



1. A multiprocessor system, comprising:

a first microprocessor generating a first processor switch signal and a first status signal indicating one of an operating status and a halt status;

a second microprocessor generating a second processor switch signal and a second status signal indicating one of the operating status and the halt status;

a common bus operatively connected to said first and second microprocessors;

a peripheral circuit operatively connected to said common bus;

a control register operatively connected to said common bus and accessible via said common bus, by both said first and second microprocessors to generate a control signal indicating a halt request status for said first and second microprocessors in dependence upon the first and second processor switch signals;

a first gate circuit, operatively connected to said first microprocessor and to receive a first halt request signal for said first microprocessor, for producing a first halt acknowledge signal when the first status signal indicates that said first microprocessor is in the halt status;

a second gate circuit, operatively connected to said second microprocessor and to receive a second halt request signal for the second microprocessor, for producing a second halt acknowledge signal when the second status signal indicates that said second microprocessor is in the halt status;

a third gate circuit, operatively connected to said first gate circuit, said second gate circuit to receive the second halt acknowledge signal and said control register to receive the control signal, for producing the first halt request signal when the control signal indicates the halt request status for said first microprocessor and for releasing the first halt request signal when the control signal indicates the halt request status for said second microprocessor and the second halt acknowledge signal is received;

a fourth gate circuit operatively connected to said second gate circuit, said first gate circuit to receive the first halt acknowledge signal and said control register to receive the control signal, for producing the second halt request signal when the control signal indicates the halt request status for the second microprocessor, and for releasing the second halt request signal when the control signal indicates the halt request status for said first microprocessor and the first halt acknowledge signal is received.

4,716,527

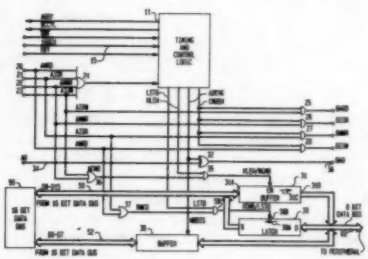
BUS CONVERTER

Alessandro Graciotti, Cupertino, Calif., assignor to Ing. C. Olivetti, Italy

Filed Dec. 10, 1984, Ser. No. 679,704

Int. Cl.[4] G06F *13/00*

U.S. Cl. 364—200 **11 Claims**



1. A bus converter device for compatibly interfacing a data processor having read and write operations and adapted for use with a data bus nm bytes wide with a first type of external device adapted for use with a data bus m bytes wide and a second type of external device adapted for use with a data bus nm bytes wide, said second type of external device generating a selection signal indicating that it requires a data bus nm bytes wide, said data processor including an instruction set having both m byte wide operations and nm byte wide operations, said device comprising:

nm bytes input data bus nm bytes wide coupled to said data processor for transmitting data between said data processor and said external devices, said input data bus being divided into low portions and high portions;

timing and control logic means for detecting whether a data processor operation is a nm or m byte wide operation, said timing and control logic means including means for effecting a first cycle of operation when a m byte wide operation is detected and a second cycle of operation longer than said first cycle when a nm byte wide operation is detected;

one m byte output data bus m bytes wide coupled to m byte wide external devices for transmitting data between said data processor and said m byte wide external devices;

data bus portion selecting means coupled between said nm byte input data bus and said m byte output data bus, and responsive to said timing and control logic means for selectively coupling one of said bus portions to said m byte output data bus during a write operation and for sequen-

tially coupling said high data bus portion to said m byte output data bus, followed by said low bus portion during a read operation; and

means in said timing and control logic responsive to said selection signal and effective when said nm byte wide external devices are communicating with said data processor for disabling said timing and control logic means whereby said bus converter device is bypassed.

4,716,528

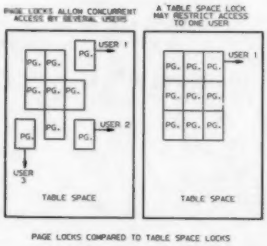
METHOD FOR MANAGING LOCK ESCALATION IN A MULTIPROCESSING, MULTIPROGRAMMING ENVIRONMENT

Richard A. Crus, San Jose; Donald J. Haderle, Los Gatos, and Howard W. Herron, San Jose, all of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Feb. 3, 1986, Ser. No. 825,508

Int. Cl.[4] G06F *9/46*

U.S. Cl. 364—300 **5 Claims**


PAGE LOCKS ALLOW CONCURRENT ACCESS BY SEVERAL USERS
A TABLE SPACE LOCK MAY RESTRICT ACCESS TO ONE USER
USER 1
USER 2
USER 3
TABLE SPACE
TABLE SPACE

PAGE LOCKS COMPARED TO TABLE SPACE LOCKS

1. A computer method for managing granularity of lockable resources and concurrency of access among a plurality of asynchronous processes making references to said resources in a multiprocessing environment,

said environment including a facility for selectively imposing a predetermined number of locks on resources of small granularity (page locks) and large granularity (table locks),

the facility (1) granting a lock responsive to a request from a referencing process or system condition, (2) assigning said granted lock to the requesting process and the referenced lockable resource, and (3) maintaining a current count of the number and type of locks and their distribution by process and resource,

comprising the steps of:

(a) establishing a first limit on the number of small granularity locks (page locks) which may be granted by the facility for each lockable resource, said first limit having a magnitude set consistent with an expectation of resource use among the processes making reference thereto, and establishing a second limit on the number of locks assignable per process;

(b) granting locks by the facility to requesting processes in an order determined by availability and request;

(c) upon a requesting process being granted a small granularity lock by the facility on a resource referenced by said process which would result in the number of said locks reaching the first limit for that resource,

(c1) withdrawing the small granularity locks assigned to the referenced resource, and

(c2) granting a large granularity lock (tablespace) on the resource to a predetermined one of the referencing processes; and

(d) upon a process requesting a lock, the grant of which would result in reaching the second limit, refusing the grant of the lock by the facility to said requesting process.

4,716,529

ELECTRONIC GAME APPARATUS

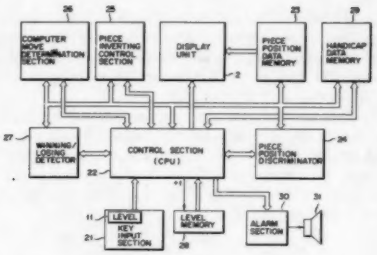
Jin Nakayama, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 632,531, Jul. 19, 1984, abandoned. This application Nov. 12, 1986, Ser. No. 930,955

Claims priority, application Japan, Jul. 29, 1983, 58-137475

Int. Cl.[4] A63F *3/02*

U.S. Cl. 364—410 **10 Claims**



1. An electronic game apparatus, comprising:

display means for displaying a game board, a plurality of pieces identified with a challenger player, and a plurality of pieces identified with a computer player, said game board having piece positions in the form of a matrix comprised of a plurality of rows and a plurality of columns;

piece position data memory means for storing piece identification data which includes identities and positions of the pieces identified with the challenger and computer players as displayed on said display means;

handicap data storage means for storing handicap data including patterns of pieces identified with the challenger and computer players which patterns are unfavorable to the challenger player;

handicap data designation means for designating handicap data stored in said handicap data storage means;

controlling means for reading the handicap data designated by said handicap data designation means, and for writing the readout data in said piece position data memory means;

piece position input means for enabling the challenger player to designate a position of a row and column of a challenger player's piece which is to be displayed on the game board and stored in said piece position data memory means;

piece identification data altering means coupled to said piece position input means for altering, after the designated position of the challenger player's piece is stored in said piece position data memory means, piece identification data identified with the computer players stored in said piece position data memory means in accordance with relative positions between the pieces identified with the challenger and computer players stored in said piece position data memory means; and

determination means coupled to said piece position input means, said piece position data memory means and said piece identification data altering means, for determining, by the use of a determination program, piece position data of the computer player's piece on the basis of piece position data of a challenger player's piece newly input through said piece position input means, and the piece identification data of said piece position data memory means that has been altered by said piece identification data altering means, storing the thus-determined data in said piece position data memory means, and for subsequently causing said piece identification data altering means to operate.

4,716,530

SYSTEM FOR AUTOMATICALLY CONTROLLING MOVEMENT OF UNMANNED VEHICLE AND METHOD THEREFOR

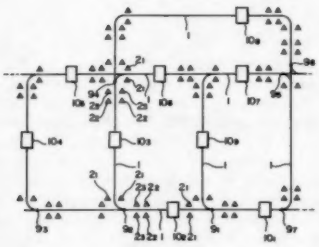
Hiroshi Ogawa; Yasuyuki Miyazaki, both of Aichi; Susumu Yoshida, Kakamigahara, and Shinichi Sasaki, Nagoya, all of Japan, assignors to Kabushiki Kaisha Meidensha, Tokyo, Japan

Filed Feb. 22, 1985, Ser. No. 704,522

Claims priority, application Japan, May 21, 1984, 59-74140; May 21, 1984, 59-74145; Jul. 9, 1984, 59-142037

Int. Cl.[4] G06F 15/50

U.S. Cl. 364—424 18 Claims



1. A system for automatically controlling movement of an unmanned vehicle, comprising:

(a) first means having at least one curved corner defining at least one predetermined route from a starting point to a final destination of the vehicle so as to guide the vehicle to move therealong, the first means including (a) a guide wire extended on the ground along the predetermined route of movement, (b) a generator for generating an alternating current magnetic field around the guide wire, and (c) a detector installed on the vehicle for detecting the magnetic field around the guide wire and outputting a signal indicating the intensity of the magnetic field;

(b) second means, disposed near the first means along the predetermined route, for indicating one of various movement control modes to be carried out by the vehicle, the second means including a plurality of markers, each marker located on at least one side of said guide wire adjacent to the curved corner and each marker generating a signal;

(c) third means, installed on the vehicle, for detecting the presence of said second means as the vehicle moves; and

(d) fourth means, installed on the vehicle and having predetermined data on the various control modes of movement of the vehicle to be carried out sequentially during movement of the vehicle along the predetermined route when said second means is detected by said third means for controlling the movement of the vehicle along the predetermined route, the fourth means controlling the movement of the vehicle in any one of the various control modes and controlling the movement direction of the vehicle according to the total detected number of said markers so as to move the vehicle along the guide wire in accordance with the signal from the detector.

4,716,531

TWO LANE ENGINE CONTROL SYSTEM

Arthur F. Saunders, Gloucester, England, and Edward S. Eccles, Bishops Cleeve, Near Cheltenham, United Kingdom, assignors to Dowty and Smiths Industries Controls Limited, Cheltenham and Smiths Industries Public Limited Company, London, both of, England

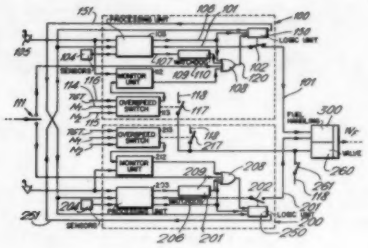
Continuation of Ser. No. 603,871, Apr. 25, 1984, abandoned.

This application Jun. 2, 1986, Ser. No. 871,134

Claims priority, application United Kingdom, May 10, 1983, 8312822

Int. Cl.[4] G06F 11/00

U.S. Cl. 364—431.02 13 Claims



1. An engine control system comprising: first and second control means; means for supplying input signals to said first and second control means; means for supplying output signals from one of said first and second control means to control operation of an engine in response to said input signals; relay means connected intermediate said first and second control means and said engine, said relay means being operable to supply output signals to the engine from either said first control means or said second control means; limiter means; means for supplying signals representative of the actual performance of the engine to said limiter means independently of said first or second control means, the limiter means being operable to override control of said engine by said first or second control means, and said limiter means itself controlling operation of said engine not to exceed predetermined operational parameters, when the one of said control means then controlling the engine causes said engine to exceed said predetermined operational parameters; monitor means having timer means therein, said monitor means providing an output response signal when the engine has been operated at said predetermined operational parameters for more than a predetermined period of time; and means supplying said output response signal from said monitor means to said relay means to disconnect the one of said control means which is producing the limited control of said engine and to connect instead the other of said control means to said engine.

4,716,532

CLINKER MANUFACTURE CONTROL USING FALLING CLINKER COLORIFIC ENERGY MEASUREMENT

Philippe Benoit, Lambersart; Alain Chielens, Mouvaux, and Jean-Paul Voisin, Helemmes, all of France, assignors to Fives-Cail Babcock, Paris, France

Filed Mar. 10, 1986, Ser. No. 838,146

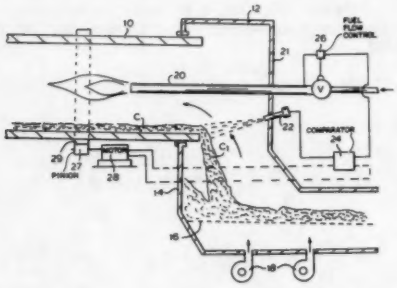
Claims priority, application France, Mar. 13, 1985, 85 03660

Int. Cl.[4] F27B 7/42; C04B 7/44; G01J 5/52

U.S. Cl. 364—477 3 Claims

1. In a method of operating an installation for the manufacture of clinker, which installation comprises a rotary tubular kiln having an open discharge end for the clinker produced inthe kiln, a cooler for the clinker connected to the discharge end, a hood covering the open discharge end and the cooler, the hood enclosing an atmosphere, hot clinker falling from the open discharge end into the cooler in a downward direction and cooling air passing in the cooler through the hot clinker

and heated by the hot clinker, the heated cooling air flowing through the atmosphere of the hood towards the open discharge end countercurrently to the falling hot clinker, and a burner mounted in the hood and extending into the open discharge end of the rotary tubular kiln, the improvement comprising the steps of measuring the calorific energy radiated by



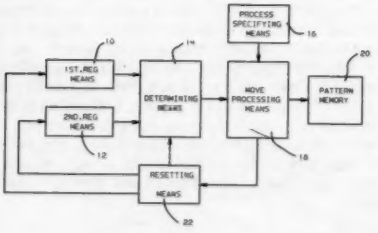
the falling hot clinker across the atmosphere of the hood to establish a measured value, comparing the measured value with a predetermined reference value for said radiated calorific energy, and controlling at least one operating parameter of said installation in response to the difference between the measured and reference values to maintain the content of free lime in the clinker within predetermined limits.

4,716,533

IMAGE TRANSLATION SYSTEM

Keiji Ohmori, Yokohama, Japan, assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 23, 1985, Ser. No. 726,263
Claims priority, application Japan, Apr. 27, 1984, 59-84166
Int. Cl.[4] G06F *3/14*
U.S. Cl. 364—518 **5 Claims**



1. For execution by an image processing system for rotating by $n \times 90°$ (n=1, 2, 3) an image of a rectangular source area in a memory and moving the image to a rectangular destination area partly overlapping the source area, the method which comprises:

(a) scanning the source and destination areas for each of four sides (upper, lower, left and right) in a predetermined order to find whether the destination area includes a non-overlapping sub-area which is positioned along the side and not included in the source area,

(b) if such a destination sub-area is found for a side, rotating and moving data from the corresponding source sub-area to the destination sub-area, and

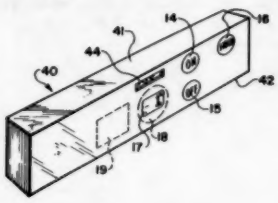
(c) redefining the source and destination areas exclusive of the processed sub-areas as new source and destination areas.

4,716,534

MICROPROCESSOR BASED LEVEL AND ANGLE FINDER

D. Michael Baucom, 9100 Sandburg Ave., Charlotte, N.C. 28213, and Sergio V. Gomez, 1713 Lyndhurst Ave., Charlotte, N.C. 28203

Filed Oct. 31, 1984, Ser. No. 666,806
Int. Cl.[4] G01C *1/00, 9/00*
U.S. Cl. 364—559 **13 Claims**



1. An angle sensor comprising:

a. a housing having a reference point thereon;

b. gravity responsive means mounted in said housing and including an eccentrically weighted disc mounted for rotation on an axis in said housing, and radially extending discrete markings thereon around the disc concentric with said axis, each of which markings defines a positional relationship relative to a gravitational vector wherein said discrete markings on said disc comprise spaced-apart lines, each line representing two degrees of arc and each space representing two degrees of arc, said sensing means comprising first and second phototransistors spaced an odd number of degrees of arc apart to sense said spaces and said markings, and a third phototransistor positioned at a predetermined angular position from said first and second phototransistors for sensing gravitational alignment of the disc with reference to a zero degree reference marking on said disc;

c. sensing means stationarily mounted in said housing for sensing the passage of the markings on the disc as the housing moves in relation to said disc and the disc maintains a position corresponding to the gravitational vector;

d. means for determining the number of and direction of movement of the markings as the markings move past said sensing means, and computing the angular position of the reference point relative to the gravitational vector; and

e. display means for indicating the angular position of the reference point.

4,716,535

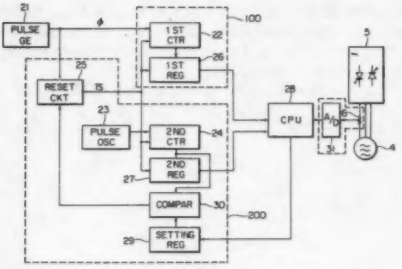
SPEED DETECTION APPARATUS

Koichi Yoshida, Kobe, and Joji Kawai, Akashi, both of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Apr. 26, 1985, Ser. No. 727,799
Claims priority, application Japan, May 29, 1984, 59-111779
Int. Cl.[4] G05B *5/00*; G01P *3/48*
U.S. Cl. 364—565 **2 Claims**

2. In a variable speed system for electric equipment, a speed detection apparatus for detecting speed of the electric equipment on the basis of a sampling interval so as to stably operate the control system, said speed detection apparatus comprising a pulse generator for generating signal pulses proportional to speed of the electric equipment, an electrical quantity-detecting unit for detecting an electrical quantity to be applied to the electric equipment, a sampling interval setting unit for changing a sampling interval responsive to variations in the electrical quantity, a counting unit connected to the sampling interval setting unit for counting signal pulses generated by said pulse generator in accordance with the sampling interval, and a calculating unit for determining speed of the electric equipment required for smooth operation on the basis of said

counted signal pulses and said set sampling interval, said electric quantity-detecting unit including a current detector for detecting an input current to the electric equipment, said counting unit including a first counter for counting said signal pulses and a first register for storing therein said counted signal pulses in response to an external reset signal, said sampling interval-setting unit including a reset circuit for generating said



external reset signal, a setting register for setting a set value in response to the input current detected by said current detector, a pulse oscillator for generating clock pulses at a predetermined frequency, a second counter for counting clock pulses from said pulse oscillator, a second register for storing therein said counted clock pulses in response to said external reset signal, a comparator for comparing said set value and said counted clock pulse, and said calculating unit including a CPU.

4,716,536

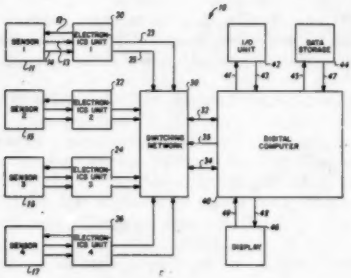
MEASUREMENT CALIBRATION

Robert L. Blanchard, Lexington, Mass., assignor to The Foxboro Company, Foxboro, Mass.

Filed Apr. 16, 1985, Ser. No. 723,763

Int. Cl.[4] G01F *23/26*

U.S. Cl. 364—571 **44 Claims**



17. Multiple unit fluid level sensor system for use in measuring fluid levels in a plurality of fluid-containing tanks, comprising:

(a) a plurality of fluid level sensor modules, each of which includes

(i) a bottom sensor segment and at least one upper sensor segment,

(ii) means for fixedly mounting one end of said sensor module within a fluid containing tank, and

(iii) at least one fluid sensor calibrator, wherein each sensor segment includes a respective calibrator channel cable and each calibrator includes an associated calibrator channel cable, and each sensor module includes at least one sensor drive cable;

(b) a plurality of source means for supplying an alternating-current drive voltage to each sensor module, and a plurality of signal processing channel means for producing a signal level related to the proportion of fluid within each respective segment, and for producing a signal level related to the proportion of fluid within each respective calibrator included with the sensor module;

(c) switching network means for selectively making connection to the sensor segment and calibrator channels; and

(d) computer means including input/output means, data storage means, display means, arithmetic and logic unit means, and central control unit means, all capable of cooperating under programmed control;

wherein said source means supplies a voltage to the fluid level sensor module and to the calibrator via an input cable, said processing means receives a signal related to the sensed fluid level via an output cable for each measurement channel and each calibrator channel, and such signals are processed and stored by the computer to provide corrected output displays and corrected segment and total measurements related to specific sensor channels and tank fluid levels.

4,716,537

CIRCUIT ARRANGEMENT FOR SIMULATING A RESISTIVE ELEMENTARY TWO PORT DEVICE FOR USE IN A WAVE DIGITAL FILTER

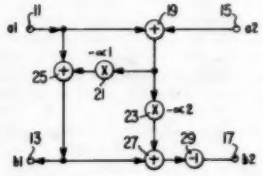
Helmut Scheuermann, Backnang, Fed. Rep. of Germany, assignor to ANT Nachrichtentechnik GmbH, Backnang, Fed. Rep. of Germany

Filed Mar. 23, 1984, Ser. No. 592,799

Claims priority, application European Pat. Off., Mar. 25, 1983, EP 83 102 9681

Int. Cl.[4] G06F *7/38*

U.S. Cl. 364—724 **11 Claims**



1. A wave two port circuit arrangement for simulating a resistive elementary two port device for use in a wave digital filter, comprising:

first and second ports each for receiving and transmitting input and output signals, respectively;

first summing means connected to said first and second ports and producing a first sum signal which represents the sum of the input signals present at said first and second ports;

first multiplier means connected to said first summing means for producing a first negatively scaled first sum signal and feeding it to one of said first and second ports as part of the output signal present at said one port;

second multiplier means connected to said first summing means for producing a second negatively scaled first sum signal and feeding to the other of said first and second ports as part of the output signal present at said other port;

second summing means connected to said one port and to said second multiplier means for producing a second sum signal which represents the sum of the output signal present at said one port and the second negatively scaled first sum signal; and

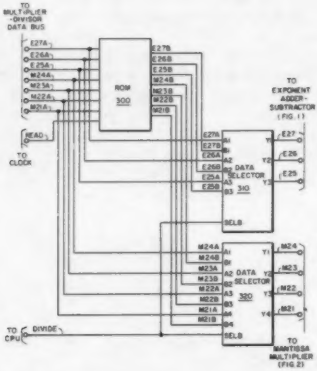
an inverter connected to said second summing means and said other port for inverting the second sum signal and feeding it to said other port to form the output signal at that port.

4,716,538

MULTIPLY/DIVIDE CIRCUIT FOR ENCODER PCM SAMPLES

Jeffrey P. Mills, Oak Park, and Max S. Macrander, Warrenville, both of Ill., assignors to GTE Communication Systems Corporation, Phoenix, Ariz.

Filed Dec. 31, 1984, Ser. No. 687,892
Int. Cl.[4] G06F 7/52
U.S. Cl. 364—754 **17 Claims**



1. A multiplier/divider circuit for use in a digital signal processing system which includes a processing unit operated to provide multiply and divide control signals, a source of pulse code modulation (PCM) samples and a source of multiplier/-divisor numbers, each sample and number having a sign bit, a plurality of exponent bits and a plurality of mantissa bits, said multiplier/divider circuit comprising:

a read-only-memory (ROM) connected to said source of multiplier/divisor numbers and operated in response to each of said numbers to provide the reciprocal thereof;

a data selection circit connected to said processing unit, to said ROM and to said source of multipllier/divisor numbers;

an adder circuit connected to said source of PCM samples and said data selection circuit; and

a multiplication circuit connected to said source of PCM samples and said data selection circuit;

said data selection circuit being operated in response to said multiply control signal to gate said multiplier/divisor exponent bits to said adder circuit and said multiplier/-divisor mantissa bits to said multiplication circuit, whereby said gated multiplier/divisor represents a multiplier,

said data selection circuit being further operated in response to said divide control signal to gate said exponent bits of said reciprocal to said adder circuit and said mantissa bits of said reciprocal to said multiplication circuit, whereby said gated reciprocal represents the reciprocal of a divisor;

said adder circuit being operated to add said multiplier exponent bits to said PCM sample exponent bits and provide a plurality of first summation signals representative of the results of said addition;

said multiplication circuit being operated to multiply said multiplier mantissa bits by said PCM sample mantissa bits and provide a plurality of first multiplication signals representative of the results of said multiplication;

whereby said adder circuit and multiplication circuit effectuate multiplication of said PCM sample and said multiplier;

said adder circuit being further operated to add said exponent bits of said divisor reciprocal to said PCM sample exponent bits and provide a plurality of second summation signals representative of the results of said addition;

said multiplication circuit being further operated to multiply said mantissa bits of said divisor reciprocal by said PCM sample mantissa bits and provide a plurality of second multiplication signals representative of the results of said multiplication;

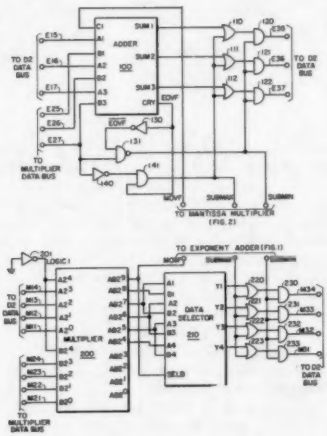
whereby said adder circuit and said multiplication circuit effectate division of said PCM sample by said divisor.

4,716,539

MULTIPLIER CIRCUIT FOR ENCODER PCM SAMPLES

Jeffrey P. Mills, Oak Park, and Max S. Macrander, Warrenville, both of Ill., assignors to GTE Communication Systems Corporation, Phoenix, Ariz.

Filed Dec. 31, 1984, Ser. No. 687,875
Int. Cl.[4] G06F 7/52, 7/38
U.S. Cl. 364—754 **14 Claims**



1. A multiplier circuit for use in a digital signal processing system which includes a source of pulse code modulation (PCM) samples and a source of multiplier numbers, each sample and number having a sign bit, a plurality of exponent bits and a plurality of mantissa bits, said multiplier circuit comprising:

an adder circuit connected to said source of PCM samples and said source of multiplier numbers; and

a multiplication circuit connected to said source of PCM samples and said source of multiplier numbers;

said adder circuit being operated to add said multiplier exponent bits to said PCM sample exponent bits and provide a plurality of summation signals representative of the results of said addition;

said multiplication circuit being operated to multiply said multiplier mantissa bits by said PCM sample mantissa bits and provide a plurality of multiplication signals representative of the results of said multiplication;

whereby said adder circuit and multiplication circuit effectuate multiplication of said PCM sample and said multiplier;

said adder circuit further operated in response to said summation signals having a value in excess of a predetermined threshold to provide an exponent overflow signal; and

a minimax gating circuit connected to said adder circuit and said source of multiplier numbers, and operated in response to the most significant exponent bit of said multiplier numbers having a first characteristic and said exponent overflow signal of a second characteristic, to provide a first substitution signal;

and further operated in response to the most significant exponent bit of said multiplier numbers having a second characteristic and said exponent overflow signal of a first characteristic to provide a second substitution signal.

4,716,540

MULTI-FUNCTIONAL FUZZY LOGIC CIRCUIT

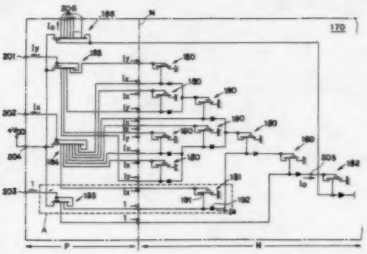
Takeshi Yamakawa, Nishigoshi, Japan, assignor to Omron Tateisi Electronics Co., Kyoto, Japan

Filed Jul. 3, 1985, Ser. No. 751,447

Claims priority, application Japan, Jul. 6, 1984, 59-141250; Jul. 6, 1984, 59-141251; Jul. 6, 1984, 59-141252

Int. Cl.[4] H03K *19/00*

U.S. Cl. 364—807 7 Claims



1. A multi-functional fuzzy logic circuit comprising:

at least one input circuit, to which at least one input current is fed, for producing at least one output current of the same value in the same direction as the input current and at least one output current of the same value in the reverse direction, and

a plurality of fuzzy logic circuits for executing different fuzzy logic operations, each of said fuzzy logic circuits having as its input at least one of said output currents produced by said at least one input circuit.

4,716,541

BOOLEAN PROCESSOR FOR A PROGRAMMABLE CONTROLLER

Jesse T. Quatse, 2 Fifer Ave. #250, Corte Madera, Calif. 94925

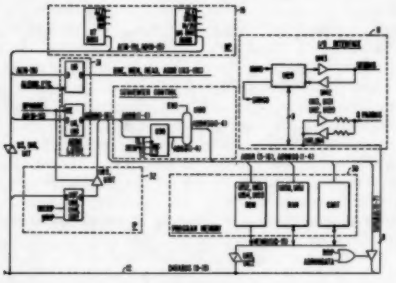
Filed Aug. 2, 1984, Ser. No. 637,772

Int. Cl.[4] G06F *9/22, 9/00;* G05B *19/18*

U.S. Cl. 364—900 24 Claims

MICROFICHE APPENDIX INCLUDED

(1 Microfiche, 23 Pages)



1. A Boolean processor for manipulating a plurality of Boolean variables stored in an associated I/O image memory by executing programs stored in an associated program memory, comprising:

a node memory having a plurality of individually addressable locations; AT- register; a destination register; and

means for interpreting instructions fetched from the associated program memory and directing corresponding operations including

means, activated on the occurrence of at least one of a first class of instructions (structure instructions), for specifying selected first and second node memory locations in said node memory, storing the address of said second node memory location in said address destination register, performing a binary logical operation on the logical values stored in said first and second node memory locations, and storing the result of said binary logical operation in said second node memory location, and

means, activated on the occurrence of a second class of instructions (input instructions), for specifying a selected location in the associated I/O image memory, reading an input variable from said selected location in the associated I/O image memory and performing a logical AND between said input variable and the content of said T-register.

4,716,542

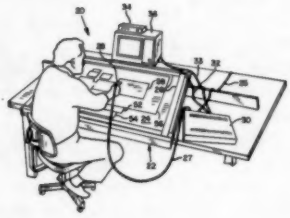
METHOD AND APPARATUS FOR SINGLE SOURCE ENTRY OF ANALOG AND DIGITAL DATA INTO A COMPUTER

Curtis L. Peltz, Lake Oswego, Oreg.; George F. Martin, Ivoryton, Conn., and Peter H. Blake, Portland, Oreg., assignors to Timberline Software Corporation, Portland, Oreg.

Filed Sep. 26, 1985, Ser. No. 781,268

Int. Cl.[4] G06F *15/64, 15/60, 3/033*

U.S. Cl. 364—900 10 Claims



1. A method for inputting two-dimensional graphical data from a first, construction drawing and processing instructions from a second drawing into a computer system through a digitizer means for sensing location coordinates of a user-designated point on a drawing and outputting a corresponding digitizer output signal; the computer system including a computer having logic and memory circuitry, a keyboard and a display terminal connected to the computer via data input and output means, and a prestored construction cost estimation program; the keyboard including keys defining a set of alphanumeric keyboard symbols and electrical circuitry for transmitting to the computer different signals uniquely defining each of said keyboard symbols; and the second drawing containing image of a keyboard comprising a first set of visible symbols corresponding to the set of keyboard symbols and a second set of symbols corresponding to preselected formulae; the method comprising:

storing in the computer memory circuitry a coordinates map defining the coordinates of the first and second keyboard image, a first set of formulae in the logic and memory circuitry for making dimensional computations and a second set of unique signals corresponding to the keyboard symbols and which mimic the electrical signals generated by the keyboard circuitry;

digitizing the coordinates of user-designated points on each of said drawings and outputting corresponding digitizer output signals;

processing each digitizer output signal in accordance with the stored coordinates map to determine upon which drawing said point was designated and the coordinates of the location of the point thereon;

for a digitizer output signal corresponding to a location of a point on the first drawing, formatting said coordinates as graphic data point coordinates;

for a digitizer output signal corresponding to a location of a point on the second drawing, generating from the logic and memory circuitry a selected one of said set of unique symbols;

processing a first digitizer output signal corresponding to a

first location on the keyboard image through said coordinates map to select one of said formulae;

processing a second digitizer output signal corresponding to graphic data coordinates of at least two points on the construction drawing including utilizing said coordinates within the selected formula to produce a resultant answer; and

transmitting said resultant answer to the keyboard data input means for further processing by said estimation program.

7. A system for detecting and processing analog graphic data shown on a drawing in a computer operable from an electrical alphanumeric keyboard through digital keyboard data input means for inputting electrical symbols to the computer and programmed with an applications program, the system comprising:

a digitizer means disposable on a flat work surface for digitizing coordinates of a designated point on a predetermined area of said surface and outputting digital signals uniquely identifying the coordinates of each designated point;

means defining an image of a computer keyboard for displaying visible symbols including a first set of alphanumeric characters and a second set of predetermined function symbols; and

digitizer interface program means for preprocessing the digital signals output from the digitizer means to generate and transmit a modified set of digital output signals to the applications program via the digital data input means, the interface program means including:

first prestored keyboard character means for generating first digital symbols in a form which mimic the electrical alphanumeric keyboard characters;

second prestored function means including a set of formulae for making dimensional computations and generating second digital symbols defining results of the computations in the form of said keyboard characters;

means for discriminating between digitized coordinates of points of said image and said drawing positioned in common within said predetermined area; and

addressing means responsive to each of a predetermined subset of the digital signals from the digitizer means for accessing one of the first and second prestored means, the addressing means comprising:

logic means for comparing the digital signals from the digitizer to said predetermined subset and, for a digital signal within said subset, selecting one the first and second prestored means,

means including a prestored coordinates map defining relative coordinates of the first and second set of visible symbols for selectively accessing one of a first unique symbol stored in the first prestored keyboard character means, or a unique formula stored in the second prestored function means to generate a second unique symbol;

means for outputting the selected unique symbol to the digital data input means; and

locating means operable by a user after positioning the image means in said predetermined area for inputting digital signals identifying the location of the first and second sets of symbols as image coordinates within said area and linking said image coordinates to the relative coordinates of the coordinates map of the first and second drawings.

4,716,543

TERMINAL DEVICE FOR EDITING DOCUMENT AND COMMUNICATING DATA

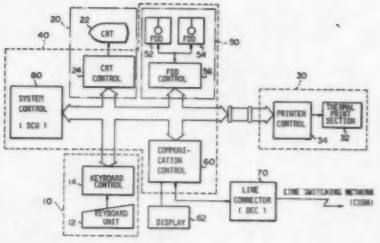
Toshiya Ogawa, Kawasaki; Hiroaki Ueno, Tsuchiura; Toshiaki Yamada, Kawasaki, and Tomoyuki Haganuma, Yokohama, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Dec. 27, 1982, Ser. No. 453,024

Claims priority, application Japan, Dec. 29, 1981, 56-212194; Feb. 24, 1982, 57-27504

Int. Cl.[4] G06F *3/00*

U.S. Cl. 364—900 **18 Claims**



1. A terminal device for preparing a document and communicating data, comprising:

input means for inputting prepared document data, format data and control data which are necessary for document preparation, document transmission and system control;

display means for displaying data which are necessary for document preparation;

print means for printing prepared document data and received document data;

external storage means for storing prepared document data and received document data;

communication control means for receiving document data and controlling transmission and reception of document data, the communication control means having a memory for storing prepared document data for transmission and received document data; and

system control means having a supervisor program for alternately executing an operating system program for outputting the received document data from said memory to the print means and to the external storage means and a communications control program for storing the prepared document data and the received document data in the memory, the supervisor program controlling the operating system program and the communications control program in such a manner that received document data can be alternately output from said memory to the print means and to the external storage means simultaneously with document preparation using the input means and the display means; and stored in said memory simultaneously with document preparation using the input means and the display means.

4,716,544

VARIABLE DIMENSION AND VARIABLE ORIENTATION GRAPHICS BIT-MAP COMPUTER MEMORY

George S. Bartley, Waltham, Mass., assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Apr. 20, 1983, Ser. No. 486,733

Int. Cl.[4] G06F *7/00, 15/626*; G06K *9/32*

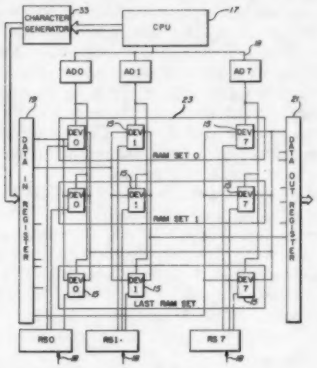
U.S. Cl. 364—900 **18 Claims**

1. Apparatus for providing character data bits to an output device comprising:

means for storing and outputting data bits comprising a plurality of characters;

a memory means having a plurality of address lines and a plurality of input lines, the input lines being connected to

receive a character from said storing means, said address lines being connectable for receiving a plurality of first address groups each defining a selected character orientation, said memory means being responsive to each address group to store a character in said said memory means in the orientation defined by said address group, said memory means further having a plurality of output lines for outputting a stored character upon receipt of a plurality of second addresses; and



means connected to said address lines for addressing said memory means with one of said address groups to cause storage of a character in a selected orientation and for addressing said memory means with said second addresses for supplying character data bits to said output device;

wherein the orientations are selected according to the following addresses:

$$\text{AREG}_i^r = \text{AREG}_{i-1}^{r-1} + K, \text{ for } i > 0 \quad \text{(a)}$$

$$\text{AREG}_i^r = \text{AREG}_{N_B-1}^{r-1} + 1 + K, \text{ for } i = 0$$

or

$$\text{AREG}_0^r = \text{AREG}_7^{r-1} + 1 + K$$

where r=row number, i=device number and AREG equals the address for changing to row r from row r−1;

$$\text{AREG}_i^c = \text{AREG}_{i-1}^{c-1}, \text{ for } i > 0 \quad \text{(b)}$$

$$\text{AREG}_i^c = \text{AREG}_{N_B-1}^{c-1} + 1, \text{ for } i = 0$$

or

$$\text{AREG}_0^c = \text{AREG}_7^{c-1} + 1$$

where AREG is the address and c is the column changed-to, give device i;

$$\text{AREG}_i^r = \text{AREG}_{i+1}^{r-1} - K, \text{ for } i < N_B - 1 \text{ (or } i < 7); \quad \text{(c)}$$

$$\text{AREG}_{N_B-1}^r = \text{AREG}_0^{r-1} - K - 1, \text{ for } i = 7$$

or

$$\text{AREG}_7^r = \text{AREG}_0^{r-1} - K - 1$$

where AREG is the address and r is the row changed-to for device i;

$$\text{AREG}_i^c = \text{AREG}_{i+1}^{c-1}, i < N_B - 1 \text{ (or } i < 7); \quad \text{(d)}$$

-continued

$$\text{AREG}_{N_B-1}^c = \text{AREG}_0^{c-1} - 1, i = N_B - 1$$

or

$$\text{AREG}_7^c = \text{AREG}_0^{c-1} - 1$$

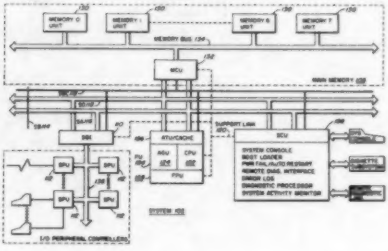
where AREG is the address, c is the column changed-to for device i, and wherein N_B is the number of bits passed in parallel to said matrix and K is an integer.

4,716,545

MEMORY MEANS WITH MULTIPLE WORD READ AND SINGLE WORD WRITE

David L. Whipple, Braintree, and Edward D. Mann, Methuen, both of Mass., assignors to Wang Laboratories, Inc., Lowell, Mass.

Filed Mar. 19, 1985, Ser. No. 713,365
Int. Cl.[4] G06F *13/00*
U.S. Cl. 364—900 **17 Claims**



1. A memory unit for storing information units which is interconnected during operation with a main memory control unit, the memory unit comprising, in combination:

a bus coupling the memory unit to the memory control unit for transferring in the alternative no more than a single information unit at one time and no more than a single memory address specifying an information unit in the memory unit at another time, the information unit being transferred either to or from the memory unit and the address being transferred only thereto;

memory request receiving means coupling the memory unit to the memory control unit for receiving a read request which specifies a variable number of information units;

memory storage means coupled to the bus for storing the information units and outputting information units in response to internal addresses; and

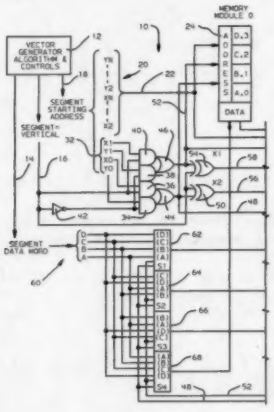
internal control means coupled to the bus and to the memory request receiving means and responsive to the read request and a memory address received on the bus for providing a sequence of internal addresses which specifies a sequence of the information units, the sequence of information units always beginning with the information unit specified by the memory address, always having the information units ordered by increasing memory address, and always containing the number of information units specified by the read request, the number being independent of the memory address,

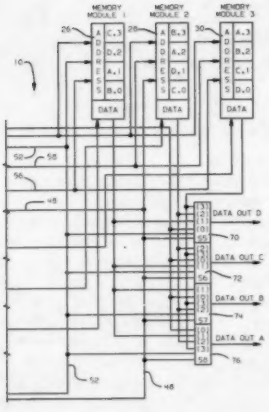
whereby the memory unit outputs the sequence of information units specified by the memory address and the memory read request to the bus.

4,716,546
MEMORY ORGANIZATION FOR VERTICAL AND HORIZONTAL VECTORS IN A RASTER SCAN DISPLAY SYSTEM

William F. Beausoleil, Hopewell Junction, and David F. McManigal, Stormville, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jul. 30, 1986, Ser. No. 890,662
Int. Cl.[4] G06F 9/00
U.S. Cl. 364—900 5 Claims





1. A memory organization for a raster-scan display refresh memory organized in square pixel groups organized in memory segments consisting of physically separate memory modules for separate portions of pixel groups where high order address bits select modules and low order address bits select within modules, comprising:

a memory segment for an N×N pixel display area where N is a power of two and wherein the memory segment contains N physically separate addressable memory modules,

memory address generating means for addressing each of said memory modules with data, said memory address means having the highest order address bits thereof connected directly to the address inputs of each of said memory modules,

vector generating means for producing display vectors connected to said memory address generating means and for producing an output control signal when a vertical vector is generated and sent to said memory address generating means,

input data selector means (62,64,66,68) for receiving input data and said low order address bits for said data and for providing said data to said memory modules in a rotated form representative of a wrap-around rearrangement of raster-scan lines,

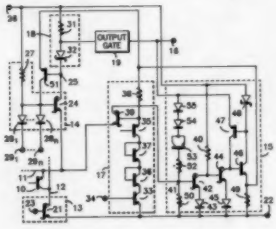
memory address transforming means connected to said memory address generating means and said vector generating means for receiving said low order bits of said memory address and said vertical vector control signal and consisting of a logic tree having Exclusive OR gate means as outputs for providing unchanged rotated addresses to said memory modules in the absence of said vertical vector control signal and for providing tilted memory addresses for vertical vectors by changing address bit values in the presence of said vertical vector control signal to write vertical vectors into said memory modules orthogonally to horizontal vectors, and

memory output data selector means (70,72,74,76) connected to receive data from said memory modules for derotating memory data as it is read out of memory to a display refresh cycle by restoring the data to a raster-scan display arrangement from the arrangement in which it was stored in memory.

4,716,547
CURRENT SWITCH FOR PROGRAMMING VERTICAL FUSES OF A READ ONLY MEMORY

Ira E. Baskett, Tempe, Ariz., and Gene T. Sluss, Chippewa Falls, Wis., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Apr. 7, 1986, Ser. No. 849,089
Int. Cl.[4] G11C 11/40
U.S. Cl. 365—96 24 Claims



1. A current switch for programming a plurality of vertical fuses of a read only memory, said current switch and said read only memory both monolithically integrated on the same chip, each of said fuses uniquely coupled between one of a plurality of word lines and one of a plurality of bit lines, said read only memory including a row decode, a sense amplifier, an output gate, and an output terminal, said sense amplifier coupled to one of said word lines by said row decode and to said output terminal by said output gate, said current switch comprising:

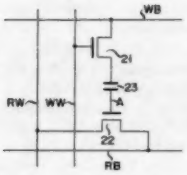
first means coupled between said output terminal and said row decode for switchably transmitting a programming voltage to said row decode from said output terminal, said programming voltage then being applied to said one of said word lines and one of said fuses, wherein said voltage will program said fuse an cause the voltage thereacross to change; and

second means coupled between said row decode and said first means for switching said first means to prohibit said programming voltage from passing therethrough when said voltage change has been sensed.

4,716,548
SEMICONDUCTOR MEMORY CELL

Tohru Mochizuki, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Feb. 12, 1986, Ser. No. 828,863
Claims priority, application Japan, Feb. 13, 1985, 60-25689; Mar. 28, 1985, 60-64434; Mar. 30, 1985, 60-66809; Mar. 30, 1985, 60-67055
Int. Cl.[4] G11C *11/00, 11/24, 11/34;* H01L *29/78*
U.S. Cl. 365—149 18 Claims



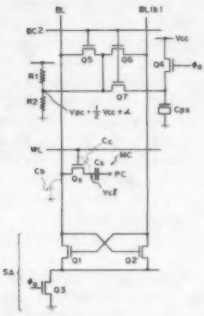
1. A semiconductor memory cell comprising:
a bit line for writing data;
a word line for writing data;
a bit line for reading out data;
a word line for reading out data;
a MOS transistor for writing data, one terminal of the drain-source path of the MOS transistor being connected to said bit line for writing data, and the gate electrode of the MOS transistor being connected to said word line for writing data;
a capacitor for storing charges, one electrode of the capacitor being connected to the other terminal of the drain-source path of the MOS transistor; and
a MOS transistor for reading out data, one terminal of the drain-source path of the MOS transistor being connected to said bit line for reading out data, the other terminal of the drain-source path of the MOS transistor being connected to said word line for reading out data, and the gate electrode of the MOS transistor being connected to the other electrode of said capacitor.

4,716,549
SEMICONDUCTOR MEMORY DEVICE HAVING A CIRCUIT FOR COMPENSATING FOR DISCRIMINATING VOLTAGE OF MEMORY CELLS

Masao Nakano, Kawasaki; Yoshihiro Takemae, Tokyo; Tomio Nakano, Kawasaki; Shigeki Nozaki, Kuwana; Kimiaki Sato, Tokyo, and Nobumi Kodama, Kawasaki, all of Japan, assignors to Fujitsu Limited, Kanagawa, Japan

Filed Aug. 29, 1986, Ser. No. 901,680
Claims priority, application Japan, Oct. 8, 1985, 60-222757
Int. Cl.[4] G11C *7/02, 11/24*
U.S. Cl. 365—203 7 Claims

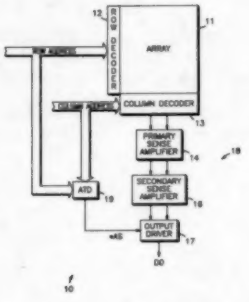
1. A semiconductor memory device having a circuit for compensating for a discriminating voltage of a memory cell, comprising:
a bit line pair consisting of first and second bit lines;
a memory cell comprising a memory capacitor for storing data and a gate circuit capable of coupling the memory capacitor to the first bit line of the bit line pair;
a word line, connected to the gate circuit, for energizing and deenergizing the gate circuit to control coupling and decoupling of the memory cell to and from the first bit line;
a sense amplifier connected to the bit line pair, which sense amplifier being adapted to sense and amplify a voltage at the first bit line by using a precharge voltage of the second bit line as a reference voltage in an active state of the semiconductor memory device; and
a precharge circuit for precharging the bit line pair to a predetermined resultant precharge voltage in a reset state of the semiconductor memory device,
wherein the precharge circuit precharges the bit line pair with the resultant precharge voltage obtained by adding a compensating voltage to a precharge voltage in the reset state, the compensating voltage being adapted to compensate for variation in a memory cell discriminating voltage based on variation in a memory cell voltage caused by capacitive coupling of the word line to the memory capacitor due to a parasitic capacitance of the gate circuit in the active state, and the precharge voltage being adapted to optimize the memory cell discriminating voltage when it is assumed that the parasitic capacitance is not present.



4,716,550
HIGH PERFORMANCE OUTPUT DRIVER

Stephen T. Flannagan, and Paul A. Reed, both of Austin, Tex., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jul. 7, 1986, Ser. No. 882,569
Int. Cl.[4] G11C *13/00*
U.S. Cl. 365—207 8 Claims



4. In a memory having an array of memory cells, each memory cell for containing data therein in the form of a first pair of differential signals; decoder means for selecting a memory cell in response to an address; and a sense amplifier for receiving data from the selected memory cell and for providing a pair of differential signals representative of the data received from the selected memory cell; an output driver comprising:
a first input line for receiving a first signal of the pair of differential signals;
a second input line for receiving a second signal of the pair of differential signals;
a first transistor having a first current electrode coupled to a first power supply terminal, a second current electrode for providing an output signal of the memory, and a control electrode;
first logic means, having a first input coupled to the first input line, an output coupled to the control electrode of

the first transistor, and a second input for receiving a disable signal, for providing said output at a logic state which causes the first transistor to be non-conductive when the disable signal is present and for providing said output at a logic state responsive to a logic state present on the first input line when the disable signal is not present;

a second transistor having a first current electrode coupled to a second power supply terminal, a second current electrode coupled to the second current electrode of the first transistor, and a control electrode; and

second logic means, having a first input coupled to the second input line, an output coupled to the control electrode of the second transistor, and a second input for receiving the disable signal, for providing said output at a logic state which causes the second transistor to be non-conductive when the disable signal is present and for providing said output at a logic state responsive to a logic state present on the second input line when the disable signal is not present;

a first inverter having an input coupled to the first input line, and an output;

a third transistor having a first current electrode coupled to the first input line, a control electrode coupled to the output of the first inverter, and a second current electrode;

a fourth transistor having a first current electrode coupled to the second current electrode of the third transistor, a control electrode for receiving the latch enable signal, and a second current electrode coupled to the first power supply terminal;

a second inverter having an input coupled to the second input line, and an output;

a fifth transistor having a first current electrode coupled to the second input line, a control electrode coupled to the output of the first inverter, and a second current electrode;

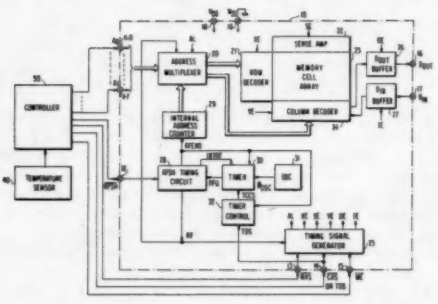
a sixth transistor having a first current electrode coupled to the second current electrode of the fifth transistor, a control electrode for receiving the latch enable signal, and a second current electrode coupled to the first power supply terminal.

4,716,551

SEMICONDUCTOR MEMORY DEVICE WITH VARIABLE SELF-REFRESH CYCLE

Yasuburo Inagaki, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Sep. 13, 1984, Ser. No. 650,153
Claims priority, application Japan, Sep. 14, 1983, 58-169773
Int. Cl.[4] G11C *7/00*
U.S. Cl. 365—222 **10 Claims**



1. A semiconductor memory comprising:

a plurality of address terminals;

a row address strobe terminal;

a column address strobe terminal;

a read/write control terminal;

a refresh terminal;

a memory cell array;

a first circuit coupled to said address terminals, said row address strobe terminal, said column address strobe terminal, said read/write control terminal and said memory cell array and activated during a data-read or data-write period in accordance with a level at said read/write control terminal to read data stored in a selected memory cell in said memory cell array or to write data in the selected memory cell; and

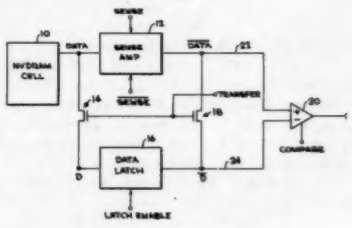
a second circuit coupled to said refresh terminal, said memory cell array and one terminal selected from said address terminals, said column address strobe terminal and said read/write control terminal and activated during a self-refresh period to refresh at least one memory cell in said memory cell array, said second circuit including an oscillator generating an oscillation signal, means for receiving a temperature detection signal supplied to said one terminal during said self-refresh period, said temperature detection signal taking a first level when an ambient temperature is equal to or higher than a predetermined value and a second level when the ambient temperature is lower than said predetermined value, and a timer circuit receiving said oscillation signal and an output of said receiving means and generating a refresh request signal in a first cycle when said temperature detection signal takes said first level and in a second cycle when said temperature detection signal takes said second level, said second circuit refreshing the memory cell in said memory cell array in response to said refresh request signal.

4,716,552

METHOD AND APPARATUS FOR NON-DESTRUCTIVE ACCESS OF VOLATILE AND NON-VOLATILE DATA IN A SHADOW MEMORY ARRAY

Ron Maltiel, Mountain View, and Robert L. Yau, Cupertino, both of Calif., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Mar. 29, 1985, Ser. No. 717,348
Int. Cl.[4] G11C *13/00, 11/40*
U.S. Cl. 365—222 **18 Claims**



13. Apparatus providing non-destructive access to at least two digital data elements comprising:

control means for generating a plurality of control and timing signals, said control signals including access control signals;

memory cell means responsive to said access control signals for storing at least a non-volatile digital data element and a volatile digital data element, and for generating at a terminal signals representative of said data stored within said data elements, said memory cell means further receiving at said terminal a signal and writing data corresponding to said signal to said non-volatile data element;

bidirectional sensing means responsive to said signals generated by said memory cell means for sampling said signals and for generating amplified signals therefrom;

latch means responsive to said signals generated by said memory cell means for temporarily storing said signals

and for generating a signal from said temporarily-stored signal;

transfer means responsive to one of said control signals, connected to said sensing means for selectively conducting said signals between said sensing means and said latch means upon receipt of said one of said control signals; and

comparator means having a first input responsive to said signal generated by said sensing means and a second input responsive to said signal generated by said latch means for generating a first signal when said signals at said first and said second input are equal and a second signal otherwise;

whereby said digital data element stored in said volatile portion of said memory cell means is read therefrom and stored in said latch means in response to said one of said control signals and said non-volatile digital data element is sampled and a signal generated therefrom by said sensing means; and

whereby said temporarily-stored signal may be conducted to said bidirectional sensing means, said amplified signal generated therefrom applied to said memory cell means terminal and rewritten to said volatile data element therein.

4,716,553

FLOAT FOR USE IN SEISMIC SURVEYS OF THE SEA BED

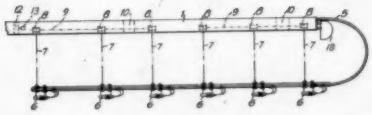
Inge Dragsund, Ulsteinvik, and Einar Gjestrum, Oslo, both of Norway, assignors to Geophysical Company of Norway A.S., Horvik, Norway

Filed Dec. 24, 1984, Ser. No. 685,449

Claims priority, application Norway, Dec. 23, 1983, 834803

Int. Cl.[4] G01V *1/38*; B63B *21/16*

U.S. Cl. 367—15 **13 Claims**



1. In a float for use in seismic surveys of the sea bed wherein an elongated float connected to a towing cable from a vessel for towing the float has at least one shaft rotatably mounted thereon, at least one seismic pulse transmitter suspension and hoisting drum on said shaft, a suspension line member on said at least one suspension and hoisting drum, a seismic pulse transmitter suspended on said suspension line, and drive means for rotating said at least one shaft and suspension and hoisting drum for raising and lowering said at least one seismic pulse transmitter with respect to said float, the improvement comprising:

an attachment means for the towing cable on said float;

at least one utility line extending from the vessel to the float for conducting power means for controlling operation of said at least one seismic pulse transmitter and drive means, the power means being operatively connected to said at least one seismic pulse transmitter and drive means;

said at least one seismic pulse transmitter being pneumatically driven;

said drive means being at least one pneumatically driven motor;

a steering control line engaging near one end thereof with the float at a position spaced from said towing cable attachment means and having the other end connected to said towing cable at a position spaced from said towing cable attachment means; and

pneumatically driven motor means mounted on said float and connected to said one end of said steering control line for adjusting the length of said steering control line to guide and control the position of the float so that varying the length of said steering control line varies the lateral deviation of the course of the float as it is towed from the longitudinal course of the vessel;

said power means of said at least one utility line being operatively connected to said length adjustment means for operating said length adjustment means.

4,716,554

TAPERED WIRING HARNESS

Donald R. Depew, Jackson; Robert A. Houghton, East Lansing, and David C. Sparks, Lansing, all of Mich., assignors to Sparton Corporation, Jackson, Mich.

Filed May 2, 1985, Ser. No. 729,812

Int. Cl.[4] G01V *1/38*

U.S. Cl. 367—20 **10 Claims**

1. A wiring harness for an array of electrical transducers comprising:

a plurality of signal wires of different lengths and being disposed in a bundle with the starting ends being approximately even and the terminal ends being staggered,

a common wire in said bundle,

a lacing of thread encircling said bundle for holding said wires together,

the end of each signal wire being outside said lacing for connection with a transducer at a take-out point,

a loop of said common wire being outside said lacing at each take-out point for connection with said transducer,

and hairing on said harness comprising multiple hairing members retained on said bundle by said lacing at a predetermined intervals.

4,716,555

SONIC METHOD FOR FACILITATING THE FRACTURING OF EARTHEN FORMATIONS IN WELL BORE HOLES

Albert G. Bodine, 7877 Woodley Ave., Van Nuys, Calif. 91406

Filed Jun. 24, 1985, Ser. No. 748,161

The portion of the term of this patent subsequent to Dec. 11, 2001, has been disclaimed.

Int. Cl.[4] G01V *1/00*

U.S. Cl. 367—35 **4 Claims**

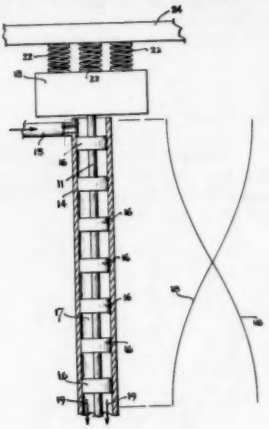
1. A method for providing sonic downward pressure for fracturing an earthen formation surrounding the borehole of a well comprising the steps of:

installing an elongated elastic column member down said well, said elastic column member having a plurality of sonic impeller elements spaced therealong and oriented for downward pumping action,

feeding pressurized fluid to said well at the upper end thereof, and

applying sonic energy to said elastic column member at a frequency such as to cause resonant standing wave vibration thereof, thereby effecting pulsating downward pumping action of the fluid against the earthen structure at the bottom of said well, the spacing between adjacent impel-

ler elements being small enough as compared with the wave length of said standing wave vibration such that



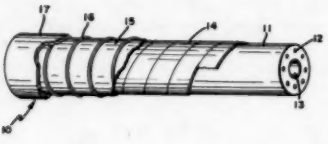
adjacent impellers operate in close phase relationship with each other.

4,716,556

MAGNETOSTRICTIVE ACOUSTIC TRANSDUCER

Donald Raskin, New York; James E. Kearney, New Hyde Park, both of N.Y., and Errol A. Haznedar, Ridgewood, N.J., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Jul. 23, 1981, Ser. No. 286,214
Int. Cl.[4] G01V *1/38*
U.S. Cl. 367—168 **16 Claims**



1. An acoustic transducer comprising support means, having disposed on at least a portion of their surface at least one layer of helically-wound ribbon of magnetostrictive ferromagnetic alloy that is at least 50% amorphous,

a solenoidal wire coil associated with the ferromagnetic alloy for detecting a change in magnetization therein, and

a magnetic shield surrounding the coil and adapted to shield the coil from external magnetic fields.

4,716,557

APPARATUS FOR INFORMATION RETRIEVAL FROM AN OPTICALLY READABLE STORAGE DISC

Kiyoshi Otani, Saitama, Japan, assignor to Sanyo Electric Co., Ltd., Japan

Filed Mar. 4, 1986, Ser. No. 836,238
Claims priority, application Japan, Mar. 8, 1985, 60-46804; Mar. 14, 1985, 60-50866
Int. Cl.[4] G11B *7/00, 27/00*
U.S. Cl. 369—32 **8 Claims**

1. An information selection device of a disc player which optically reads information of a plurality of pieces of music from a disc having a plurality of tracks where said information is optically recorded, the information of each of said plurality of pieces including piece number and index information consisting of information of the piece number of said each piece itself and information of a plurality of indexes existing within said each piece and each of said plurality of tracks having address information of said each track itself, said information selection device comprising:

pickup means for radiating a light beam on said tracks of said disc, the radiated light beam being modulated and reflected when said light beam hits said tracks,

beam detecting means for detecting said address information of the track hit by the radiated beam at present, from said reflected beam,

moving means for moving said radiated beam to make said radiated beam cross said tracks of said disc, and

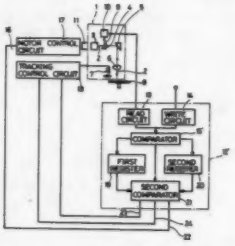
signal processing means including:

read means for reading said address information of the track hit by the radiated beam at present, detected by said beam detecting means,

write means for writing the address information of a target track defined by a desired piece to be played and a desired index within said desired piece selected out of said plurality of pieces,

first comparing means for comparing the address information of the track hit by the radiated beam at present, read by said read means, and the address information of said target track written in advance in said write means so that a control signal for reversing the moving direction of said radiated beam is generated and applied to said moving means each time it is determined that said radiated beam has passed said target track,

a first register in which the address information of the track



hit by the radiated beam is written when it is determined as a result of the comparison by said first comparing means that the address information of the track hit by the radiated beam is larger than the address information of the target track,

a second register in which the address information of the track hit by the radiated beam is written when it is determined as a result of the comparison by said first comparing means that the address information of the track hit by the radiated beam is larger than the address information of the target track and

second comparing means for comparing the address information written in said first register and the address information written in said second register; said second comparison means including means for generating a control sigtnal for decreasing the moving speed of the radiated beam from a first speed to a second speed when it is determined that the aboslute value of the difference between said address information written in said first register and said address informatiopn written in said second register is smaller than a first set value and that the radiated beam has passed the target track; said second comparison means including means for generating a control signal for decreasing the moving speed of the radiated beam from the second speed to a third speed when it is determined that the absolute value of the difference between said address information written in said first register and said address information written in said second register is smaller than a second set value and that the radiated beam has passed

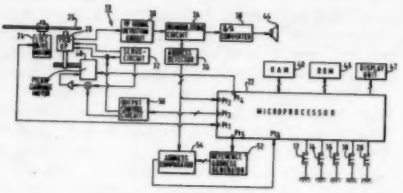
the target track; said second comparison means including means for generating a control signal for decreasing the moving speed of the radiated beam by steps until the absolute value of the difference between said address information written in said first register and said address information written in said second register becomes smaller than the n-th set value; and said second comparison means including means for thereafter generating a control signal for moving the radiated beam to the track corresponding to the address information written in said first register or said second register.

4,716,558

RECORD DISC ADDRESSING APPARATUS

Yoshitaka Katayama, Yokohama; Daiki Nabeshima, Kamakura, and Shinichi Nakamura, Kawasaki, all of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Dec. 27, 1983, Ser. No. 565,458
Claims priority, application Japan, Dec. 27, 1982, 57-234035
Int. Cl.⁴ G11B *7/00*
U.S. Cl. 369—33 **9 Claims**



1. An apparatus for accessing data stored on a disc at a preselected data address comprising:

a pickup assembly for reading from said disc a current data address, said pickup assembly being moveable in a radial direction with respect to said disc;

means for moving said pickup assembly; and

processing means including:

means for determining the difference between said current data address and said preselected data address, and

means for causing said moving means to move said pickup assembly a calculated distance in a direction to reduce the magnitude of said difference, as long as the magnitude of said difference is greater than a given prescribed address tolerance value, and for reducing said calculated distance each time the difference of the magnitudes of said given preselected data address and said current data address changes.

4,716,559

INTEGRATED OPTICAL DEVICE WITH IMPROVED ISOLATION BETWEEN THE SEMICONDUCTOR LASER AND THE PHOTODETECTORS

Shiro Hine, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 27, 1986, Ser. No. 900,792
Claims priority, application Japan, Aug. 28, 1985, 60-191012
Int. Cl.⁴ G02B *6/10, 6/32;* G11B *7/135*
U.S. Cl. 369—112 **10 Claims**

1. An optical recording and reproducing head for a laser memory disk, comprising:

a substrate (1);

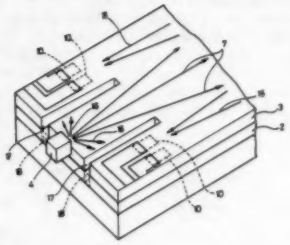
a waveguide layer (3) formed over a main surface of said substrate;

a semiconductor laser (4) provided at an end of said waveguide layer for injecting laser beams into said waveguide;

a focusing grating coupler (6) formed on said waveguide layer for focusing said injected laser beams on said disk and introducing beams reflected back from said disk into said waveguide;

beam splitter means (5) formed on said waveguide layer between said semiconductor laser and said focusing grating coupler, for bisecting said reflected beams into two distinct directions, each distinct direction being at a prescribed acute angle;

photodetector means (10) for converting said bisected beams into electrical signals;



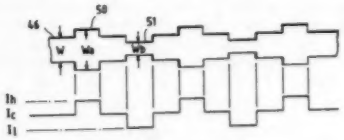
optical isolator means (17, 18) formed between said semiconductor laser and said photodetector means comprising at least one groove of a prescribed length which is cut with at least partial depth into said waveguide layer along each side of said semiconductor laser.

4,716,560

RECORDING DISC AND METHOD FOR FABRICATING SAME

Makoto Itonaga, Yokohama, Japan, assignor to Victor Company of Japan, Ltd., Japan

Filed May 17, 1985, Ser. No. 735,355
Claims priority, application Japan, May 22, 1984, 59-103476; May 22, 1984, 59-103477
Int. Cl.⁴ G11B *7/24*
U.S. Cl. 369—275 **9 Claims**



1. A recording disc comprising:

a substrate having a tracking servo groove of spiral or concentric pattern on one surface thereof, said groove having a constant depth and a variable width, the variable width groove having offset edge portions thereof offset from a predetermined width in accordance with a position indicating signal; and

a recording layer deposited on said surface of the substrate.

4,716,561

DIGITAL TRANSMISSION INCLUDING ADD/DROP MODULE

Eric H. Angell, North Andover; Thomas J. Aprille, Andover; Juan O. Azaret; Rong-Chin Fang, both of North Andover; Byeong G. Lee, Methuen, all of Mass.; Brian C. Longwell, Kingston, N.H.; Craig A. Sharper, Bradford, Mass., and Jan-Dieter Spalink, Woodbridge, Va., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

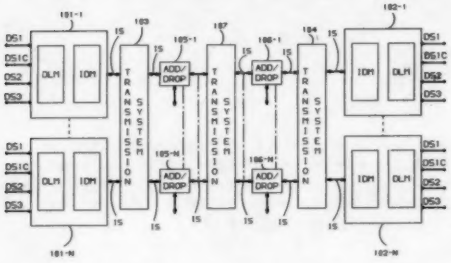
Filed Aug. 26, 1985, Ser. No. 769,509
Int. Cl.⁴ H04J *1/10, 3/08*
U.S. Cl. 370—55 **60 Claims**

1. Apparatus for adding at least one digital signal having one of one or more digital transmission bit rates to a transmission signal formed by combining a plurality of digital signals of the

one or more digital transmission bit rates, the apparatus comprising:

at least one means for formatting said at least one digital signal being added into channel frames having a predetermined number of digital words, said at least one formatting means including means for generating a number of said channel frames for said at least one digital signal being added during a first predetermined interval, said number of channel frames being dependent on a predetermined relationship of the digital transmission bit rate of said at least one digital signal being formatted and a transmission bit rate of one of a predetermined set of digital signals;

means for supplying a predetermined number of digital words from said channel frames for said at least one digital



signal being added during a predetermined frame interval of said transmission signal and for inserting said number of supplied digital words for said at least one digital signal being added into a group of data word positions of a repetititve transmission signal frame during said predetermined transmission signal frame interval, said number of digital words in said group for said at least one digital sfgnal being added being dependent on the number of channel frames that have been gernerated therefore during said first predetermined interval; and

means for combining data words from said at least one digital signal group of data word positions with data words in a repetitive frame of said transmission signal, wherein said at least one digital signal is added to said transmission signal.

4,716,562

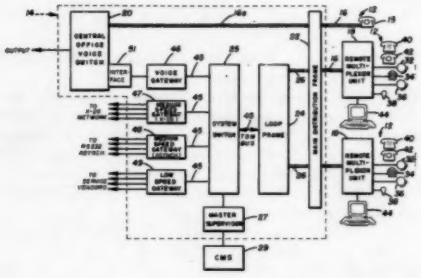
TELEPHONE SYSTEM

Gregg D. Carse, Mountain View, and Bernard N. Daines, Union City, both of Calif., assignors to Pacific Bell, San Francisco, Calif.

Continuation-in-part of Ser. No. 711,083, Mar. 12, 1985, abandoned. This application Mar. 11, 1986, Ser. No. 838,571

Int. Cl.[4] H04J *3/12*

U.S. Cl. 370—110.1 **21 Claims**



1. An information transfer system for use in a telephone system wherein full duplex digital signal bursts each containing a plurality of different types of information are transmitted between a central office and each of a plurality of subscriber locations, and wherein signals respectively containing the different types of information in a predetermine format are transmitted between the central office and each of a plurality of selected locations outside said information transfer system which may or may not be subscriber locations, said information transfer system comprising:

signal processing means for receiving and disassembling the digital signal bursts into digital information words, each digital information word being comprised of only of the types of information in the digital signal bursts, said signal processing means also being for assembling digital information words of different types of information into digital signal bursts for transmission to respective subscriber locations,

gateway means for each type of information for converting digital information words into a predetermined signal format, said gateway means including means for transmitting formatted signals for transmission to respective selected locations corresponding to respective time slots in which digital information words are received, said gateway means further including means and for receiving signals in a predetermined format from selected locations and converting same into digital information words in predetermined destination related time slots containing the respective type of information received,

switch means coupling said signal processing means to said gateway means for routing the digital information words from said signal processing means to a respective one of said gateway menas corresponding to the type of information in the digital information word being routed and in a time slot corresponding to a predetermined destination for said respective digital information word, and for routing the digital information words from each of said gateway means to said signal processing means in a predetermined time slot corresponding to a respective one of said selected locations for assembly into digital signal bursts for a particular subscriber location,

and control means coupled to said signal processing means, said gateway means, and said switch means for synchronously operating same and for placing each of said digital information words in a preallocated time slot corresponding to the source and destination of the information contained in the digital information word.

4,716,563

DEMODULATION OF AUXILIARY LOW FREQUENCY CHANNELS IN DIGITAL TRANSMISSION SYSTEMS

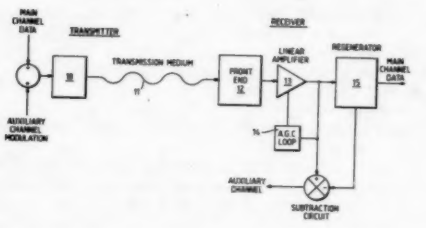
Robert C. Roust, Basildon, Great Britain, assignor to STC PLC, London, England

Filed May 19, 1986, Ser. No. 865,213

Claims priority, application United Kingdom, May 21, 1985, 8512876

Int. Cl.[4] H04J *3/12*; H04B *1/16*

U.S. Cl. 370—110.4 **6 Claims**



1. An arrangement for the demodulation of auxiliary low frequency channels in digital transmission systems comprising

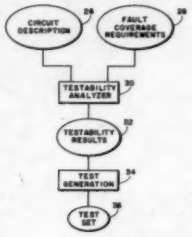
means for receiving the transmitted signals, linear amplification means with automatic gain control (AGC) to which the output of the receiving means is applied, non-linear discrimination means to which the output of the amplification means is applied for discriminating between logic levels in the amplified digital signals at the main channel bit rate, and subtraction means to one input of which the output of the amplification means is applied and to a second input of which the output of the discrimination means is applied for subtracting the output of the discrimination means from the amplified signals to obtain the auxiliary low frequency channel signals.

4,716,564

METHOD FOR TEST GENERATION

Angelo C. J. Hung, and Francis C. Wang, both of Beaverton, Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Filed Nov. 15, 1985, Ser. No. 798,649
Int. Cl.[4] G01R *31/28*
U.S. Cl. 371—27 **5 Claims**



1. A method for determining a group of test vectors for testing an integrated circuit network including a plurality of gates interconnected at nodes including input reveal a predetpermined categoriyu of faults in said network, and output terminals of said integrated circuit network to reveal a predetermined category of faults in said network, comprising the steps of:

measuring the testability of said integrated circuit network according to a test counting procedure including propagation of sensitivity test counts forwardly from input terminals to a principal output terminal and rearwardly back to said input terminals through gates between said input and output terminals of said network to provides test count matrices for the nodes of said network including said input and output terminals,

enumerating the test counts from said matrices by driving individual sensitivity values from test count matrices at said input terminals forwardly to a said output terminal and rearwardly back to said input terminals in a number of successive passes in order to accumulate the test counts described by said matrices at said nodes, and

separately storing a set of sensitivity values to which said input terminals are driven for each such pass, each set comprising a test vector for said network.

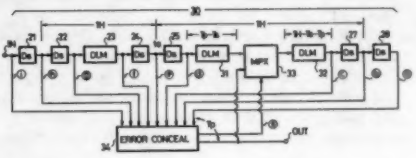
4,716,565

ERROR CONCEALING SYSTEM FOR DIGITAL DATA

Tetsuro Suma, Shinagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

PCT No. PCT/JP85/00238, § 371 Date Dec. 27, 1985, § 102(e) Date Dec. 27, 1985, PCT Pub. No. WO85/05211, PCT Pub. Date Nov. 21, 1985
PCT Filed Apr. 26, 1985, Ser. No. 826,497
Claims priority, application Japan, Apr. 27, 1984, 59-86755
Int. Cl.[4] H04N *5/21*; G06F *11/00*
U.S. Cl. 371—31 **12 Claims**

1. Error concealing method for digital data in which a reproduced data signal comprised of a plurality of data elements arranged in a matrix is supplied to an error concealing circuit and an erroneous data element in said reproduced data signal is error-concealed by interpolation based on data nearby said erroneous data element in said matrix, characterized by the steps of determining when said nearby data is erroneous, con-



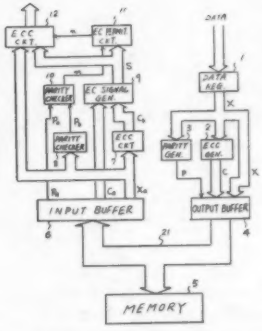
cealing the errors in said erroneous nearby data and then feeding back said error-concealed nearby data to said error concealing circuit to thereby carry out error-concealment of said erroneous data element using said error-concealed nearby data.

4,716,566

ERROR CORRECTING SYSTEM

Hiromu Masuhara, and Tsunekazu Kimura, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Aug. 20, 1985, Ser. No. 767,596
Claims priority, application Japan, Aug. 20, 1984, 59-172670
Int. Cl.[4] G06F *11/10*
U.S. Cl. 371—37 **9 Claims**



1. An error correcting system comprising:

a first error correcting code geneator means responsive to a data word for generating a first error correcting code to be added to the data word to be transmitted;

a first parity bit generator means responsive to said data word for generating a first parity bit associated with said data word;

a transmitting means for transmitting said data word, said first error correcting code and said first parity bit to an external circuit;

a receiving means for receiving through said external circuit a received data word, a received first error correcting code, and a received first parity bit;

a second error correcting code generator means responsive to said received data word for generating a second error correcting code to be added to the received data word;

a second parity bit generator means responsive to said received data word for generating a second parity bit associated with said received data word;

an error correction signal generator means for comparing said received first error correcting code and said second error correcting code and generating an error correction signal when a difference between said received first error correcting code and said second error correcting code is found;

a parity check means for comparing said received first parity

bit and said second parity bit and outputting a parity error signal when said received first parity bit and said second parity bit are different;

an error correction permitting means for outputting an error correction permitting signal ony when both said error correction signal and said parity error signal are generated; and

an error correction circuit means for correcting an error of said received data word in accordance with said error correction signal only when said error correction permitting signal is output, said error correction circuit outputting said received data word without error correction when said error correction permitting signal is not output.

4,716,567

METHOD OF TRANSMITTING DIGITAL DATA IN WHICH ERROR DETECTION CODES ARE DISPERSED USING ALTERNATE DELAY TIMES

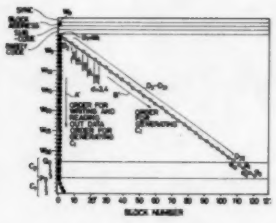
Masahiro Ito; Masaharu Kobayashi, and Takao Arai, all of Yokohama, Japan, assignors to Hitschi, Ltd., Tokyo, Japan

Filed Feb. 10, 1986, Ser. No. 827,606

Claims priority, application Japan, Feb. 8, 1985, 60-21651

Int. Cl.[4] G06F *11/10*

U.S. Cl. 371—40 **2 Claims**



1. A method of transmitting data blocks each consisting of thirty-two digital data elements as frames of one hundred and twenty-eight blocks, in which each frame also includes first and second check codes capable of detecting and correcting errors from different combinations of digital data in the blocks of the frame, said method comprising the steps of:

storing, in a memory having a plurality of block storage areas, thirty-two digital data elements in each block storage area of said memory in the order of generation of said digital data elements;

generating a plurality of sets of second check codes from the digital data stored in the memory in such a manner that each set of the second check codes is generated from thirty-two digital data elements existing alternately at delay block distances between successive elements of three and four blocks in the memory, and storing the second check codes in the memory at positions such that a delay block distance between adjacent second check codes included in each set is alternately three and four blocks;

generating a plurality of sets of first check codes in such a manner that each set of said first check codes is generated from said digital data elements and the second check codes of a respective block storage area in the memory, and storing the second check codes in the memory;

reading out from the memory and transmitting the digital data elements and the first and second check codes in the order of the block storage areas in the memory.

4,716,568

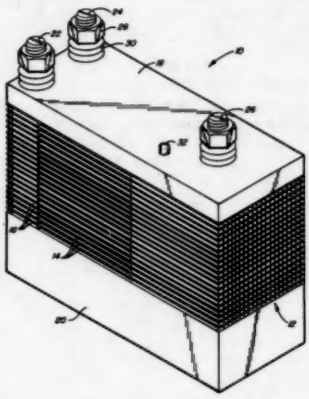
STACKED DIODE LASER ARRAY ASSEMBLY

Donald R. Scifres, San Jose; Peter Cross, Palo Alto, and Gary L. Harnagel, San Jose, all of Calif., assignors to Spectra Diode Laboratories, Inc., San Jose, Calif.

Continuation-in-part of Ser. No. 731,651, May 7, 1985, abandoned. This application May 1, 1986, Ser. No. 859,058

Int. Cl.[4] H01S *3/04*

U.S. Cl. 372—36 **20 Claims**



1. A diode laser array assembly comprising,

a plurality of linear diode laser array subassemblies stacked one above another in parallel relation, each of said subassemblies having a support plate with first and second opposed major surfaces, a linear array of diode lasers mounted to a first of said major surfaces at a front edge of said support plate, and an electrically conductive path from said first major surface in parallel via a plurality of wires through said linear array to said second major surface, each of said subassemblies being electrically connected in series to at least one adjacent subassembly, the stacked subassemblies providing clearance between the linear arrays and adjacnet subassemblies, and

heat conducting path means for removing excess heat from said linear arrays.

4,716,569

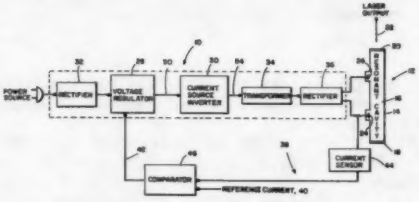
POWER SUPPLY FOR NEGATIVE IMPEDANCE GAS DISCHARGE LASERS

George L. Bees, Ashland, Mass., assignor to A.L.E. Systems, Inc., Ashland, Mass.

Filed Apr. 9, 1986, Ser. No. 849,843

Int. Cl.[4] H01S *3/04*

U.S. Cl. 372—38 **20 Claims**



1. An adjustable constant current power supply for a negative impedance gas discharge laser, comprising:

means for providing constant output of current, means connected between said constant current providing means and said gas discharge laser for matching the current

output of said constant current providing means with lasing requirements of said gas discharge laser, said constant current providing means providing electrical energy to pump the gas discharge laser; and

means electrically connected to said constant current providing means for feeding a variable controlled voltage to said constant current providing means said variable voltage altering said constant output of current over a preselected range feedback circuit means for providing a control signal to said variably controlled voltage feeding means;

such that output power of the gas discharge laser varies with said output of current from said current providing means.

4,716,570

DISTRIBUTED FEEDBACK SEMICONDUCTOR LASER DEVICE

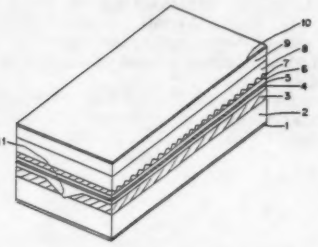
Toshihiko Yoshida, Tenri; Haruhisa Takiguchi; Shinji Kaneiwa, both of Nara, and Sadayoshi Matsui, Tenri, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jan. 6, 1986, Ser. No. 816,259

Claims priority, application Japan, Jan. 10, 1985, 60-3099; Feb. 7, 1985, 60-23169

Int. Cl.[4] H01S *3/19, 3/08;* H01L *29/161, 29/205*

U.S. Cl. 372—45 12 Claims



1. A distributed feedback semiconductor laser device comprising: an active layer positioned between a first cladding layer and a second cladding layer, wherein an absorption layer is positioned between said active layer and one of said cladding layers, said absorption layer having grooves to form a diffraction grating with a given periodicity in the direction of the propagation of laser light.

4,716,571

A HIGH-OUTPUT SEMICONDUCTOR LASER OF DOVE TAIL GROOVE TYPE

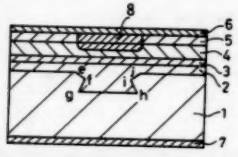
Ken Hamada, Toyonaka; Masaru Wada, Takatsuki, and Kunio Itoh, Uji, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Continuation of Ser. No. 549,758, Nov. 8, 1983, abandoned. This application Jul. 16, 1986, Ser. No. 886,763

Claims priority, application Japan, Nov. 11, 1982, 57-198713

Int. Cl.[4] H01S *3/19*

U.S. Cl. 372—48 5 Claims



1. A high-output seminconductor laser comprising:

a semiconductor substrate havng a substantially flat principal surface, and a channel formed as a groove within said principal surface and below said flat surface, said groove having a dove-tail shaped cross-section for defining an active lasing region;

a first electrode positioned on a second surface of said substrate opposite said channel;

a first clad layer formed on said principal surface of said substrate;

a flat active layer having a thickness sufficient to spread a laser light generated therein,

at least another clad layer formed on the side of said active layer opposite said first clad layer;

a second electrode positioned with respect to said active layer opposite said first electrode; and

a current injection region formed above said groove and said active layer,

said dove-tail shaped cross section having upper and lower parts which are wider than a middle part of the cross section.

4,716,572

METHOD FOR COATING CARBON AND GRAPHITE BODIES

Heinrich Kühn, Brechen; Olaf Stitz, Frankfurt, and Karl Wimmer, Nordendorf, all of Fed. Rep. of Germany, assignors to Sigri GmbH, Augsburg, Fed. Rep. of Germany

Filed Dec. 17, 1985, Ser. No. 810,313

Claims priority, application Fed. Rep. of Germany, Dec. 19, 1984, 3446286

Int. Cl.[4] H05B *7/094;* B05D *1/02, 5/12*

U.S. Cl. 373—88 12 Claims

1. Method for applying a sole, silicon-containing protective layer to the surface of a carbon or graphite body, which layer is substantially impervious to fluids, adheres well to carbon or graphite bodies and protects the bodies against attack of corrosive substances, which comprises, plasma spraying a powder consisting essentially of a silicon powder having a grain size under 0.05 mm with an inert gas/hydrogen mixture as a plasma gas at an atmospheric pressure of at most 200 h Pa to generate a protective layer 0.1 to 0.5 mm thick on the surface of the body, with the generated protective layer having a density which is at least 95% of the theoretical density.

12. A graphite electrode section for an arc furnace, the surface of which section is coated solely with a silicon-containing protective layer which is substantially impervious to fluids, adheres well to graphite bodies and protects the bodies against attack of corrosive substances, said layer obtained by plasma spraying a powder consisting essentially of a silicon powder having a grain size under 0.05 mm with an inert gas/hydrogen mixture as a plasma gas at an atmospheric pressure of at most 200 h Pa to generate a protective layer 0.1 to 0.5 mm thick on the surface of the body, with the generated protective layer having a density which is at least 95% of the theoretical density.

4,716,573

METHOD OF REDUCING THE EFFECT OF NARROWBAND JAMMERS IN RADIO COMMUNICATION BETWEEN TWO STATIONS

Bo C. Bergström, Täby, and Knut O. M. Herolf, Österskär, both of Sweden, assignors to Telefonaktiebolaget LM Ericsson, Stockholm, Sweden

Filed Nov. 8, 1985, Ser. No. 796,297

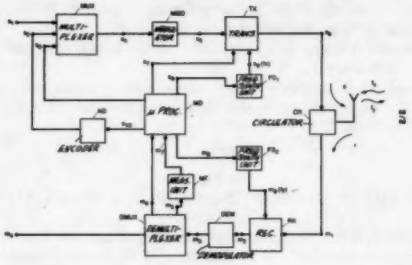
Claims priority, application Sweden, Nov. 19, 1984, 8405818

Int. Cl.[4] H04K *1/00*

U.S. Cl. 375—1 4 Claims

1. A method for reducing the effect of narrowband jammers in communication between a first station (A) and a second station (B) across a radio channel having a varying transmission quality in dependence on said jammers by using frequency hopping which includes periodically changing a transmitting frequency (fx) from the first station (A) to the second station (B) and a transmitting frequency (fy) from the second station

(B) to the first station (A) with a given period (Th), there being randomly generated a plurality of fixed frequencies ($F_1, \ldots f_n$) available for the frequency hopping, each of said frequencies having mutually different or equal status values indicative of giving disturbance free or acceptable communication across said radio channel, a characteristic signal being sent from said first station (A) to said second station (B) on one of said fixed frequencies ($f_1, \ldots f_n$) to test the channel quality for that frequency with respect to said jammers when communicating between said stations (A,B), measuring the result of the test of



said quality in said second station (B), transmitting said result from said second station (B) and receiving the same in the first station (A) in a form such that the result is not affected by said jammers, entering the result as a status value for said frequency (fx), and deciding in dependence on said status value whether said frequency should be used as a transmitting frequency (fx) or if a second frequency should be chosen as a communicating frequency, said second frequency representing a mapping frequency obtained from a previous measurement giving disturbance free communication.

4,716,574

WIRELESSLY FUNCTIONING SIGNAL TRANSMISSION SYSTEM

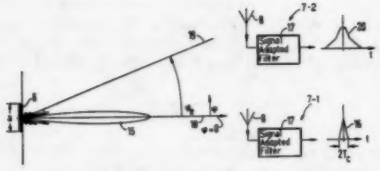
Paul W. Baier, Kaiserslautern, and Peter Rausch, Pforzheim, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Feb. 15, 1985, Ser. No. 702,322

Claims priority, application Fed. Rep. of Germany, Feb. 20, 1984, 3406083

Int. Cl.[4] H04L 7/00

U.S. Cl. 375—1 **21 Claims**



21. A spread-spectrum-system comprising a transmitter having a binary message source, a driving selection circuit receiving the output of said binary message source, a pair of signal generators connected to the output of the drive selection circuit and producing respectively spread-spectrum-signals of the form

$$s_L(t)=A \text{ rect } (t/T)p(t) \cos (2\pi f_0 t+\phi_L) \quad (1)$$

and

$$s_H(t)=A \text{ rect } (t/T)p_H(t) \cos (2\pi f_0 t+\phi_H) \quad (2)$$

where A is the amplitude of PN-PSK signal waveforms rect (t/T) representing the waveform as a function of the time of the carrier envelope which may be essentially rectangular and for a time duration T where T is equal to the product of the number L of "chips" or clock intervals respectively of said first and second generators, $p_L(t)$ is the pseudo-random sequence allocated to the logical value L and $p_H(t)$ is the pseudo-random sequence allocated to the logical value H, a directional antenna connected to the outputs of said first and second generators, a receiver located at a remote location, from said transmitter and having a receiving transducer, first and second filter correlation circuits connected to the output of said receiving transducer and said first filter correlation circuits matched to pass as output of received signal segments produced by the transmitted waveform $s_L(t)$ and said second filter correlation circuit matched to pass signal segments produced by the transmitted waveform $s_H(t)$, an envelope detector receiving the outputs of said first and second filter correlation circuits, a synchronizing means supplying synchronizing signals to said envelope detector, a first threshold circuit connected to the output of the said envelope detector, a threshold transgression duration measurement circuit connected to the output of said first threshold circuit and a second threshold circuit receiving the output of said threshold transgression duration measurement circuit and producing signal outputs.

4,716,575

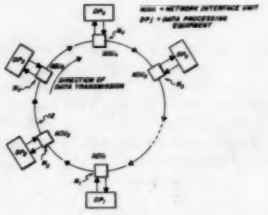
ADAPTIVELY SYNCHRONIZED RING NETWORK FOR DATA COMMUNICATION

Bryan P. Douros, Natick, and Andrew Marcuvitz, Cambridge, both of Mass., assignors to Apollo Computer, Inc., Chelmsford, Mass.

Continuation of Ser. No. 804,329, Dec. 4, 1985, abandoned, which is a continuation of Ser. No. 361,565, Mar. 25, 1982, abandoned. This application Oct. 14, 1986, Ser. No. 918,629

Int. Cl.[4] H04B 3/36

U.S. Cl. 375—3 **12 Claims**



1. A ring communications system for a plurality of data processing units coupled to a network comprising:

a plurality of substantially similar network interface units connected in series along a closed signal path ring for receiving, storing and retransmitting data bits along the closed signal path,

each including a feedback loop for continuously controlling the data retransmitting bit rate of that network interface unit in response to a comparison between the phase of the transmitted data of that unit and the phase of the received data of that unit, and for varying the data residence delay between receipt and retransmission of data in the network interface unit, such that the steady state magnitude of the phase correction of the transmitted data for a given change in the phase of the received data bits is less than or equal to unity (1) for all network interface units, and less than unity (1) for at least one network interface unit, wherein

the transmitting bit rate approaches the receiving bit rate, and,

by cumulative action of the varying of the retransmitting bit rates and attendant delays of the plurality of network

interface units, data transmission throughout the signal path ring is stabilized at a substantially common bit rate.

4,716,576
APPARATUS FOR CONTROLLING TRANSMITTER-RECEIVER

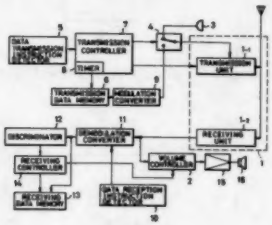
Shigeru Sakai, and Kazunori Kudo, both of Tokyo, Japan, assignors to Kabushiki Kaisha Kenwood, Japan

Filed Jul. 16, 1984, Ser. No. 631,074

Claims priority, application Japan, Jul. 20, 1983, 58-111555[U]

Int. Cl.⁴ H04B 1/40

U.S. Cl. 375—5 **5 Claims**



1. A transmitter-receiver which transmits or receives an aural signal or a data signal, comprising:

a transmitting unit (e.g. 1-1);

a receiving unit (e.g. 1-2);

a speaker (e.g. 16) for transducing an electrical signal received in said receiving unit into an acoustic sound;

a discriminator (e.g. 12) for discriminating whether an aural signal or a data signal is present in the electrical signal received in said receiving unit;

a volume controller (e.g. 2) in response to said discriminator detecting a data signal in the received signal for reducing the electrical signal applied to said speaker and thus reduce the volume of the data signal generated from the speaker, and

wherein said volume controller reduces the electrical signal to a level at which an operator can hear the acoustic sound from said speaker in response to said discriminator detecting said data signal so that the received data signal can be monitored as the acoustic sound from the speaker.

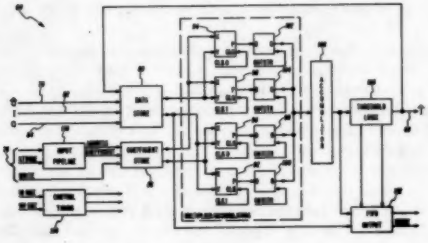
4,716,577
AUTOEQUALIZER

Henry E. R. Oexmann, Garland, Tex., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Jul. 7, 1986, Ser. No. 882,648

Int. Cl.⁴ H04B 3/04

U.S. Cl. 375—15 **12 Claims**



1. An autoequalizer for receiving continuous data streams from a first data channel and a second data channel, wherein the two data streams had originally been mixed with carriers for transmission over a single channel with a carrier of one data stream orthogonal to the carrier of the other data stream, comprising in combination:

first means for storing consecutive data samples forming a time window from a continuous data stream, responsively connected to the first data channel;

second means for storing consecutive data samples forming a time window from a continuous data stream, responsively connected to the second data channel;

first means for providing a plurality of constants, the constants corresponding to the data samples of the first means for storing;

second means for providing a plurality of constants, the constants corresponding to the data samples of the second means for storing;

first means for mathematically operating, wherein each data sample stored in the first means for storing is mathematically operated on with the corresponding constant from the first means for providing a plurality of constants;

second means for mathematically operating, wherein each data sample stored in the second means for storing is mathematically operated on with the corresponding constant from the second means for providing a plurality of constants;

first means for summing the results of the first means for mathematicallly operating;

second means for summing the results of the second means for mathematically operating;

means responsive to the first and second means for summing for generating a number corresponding to an expected value for each data sample as it existed before being originally mixed; and

means for accumulating the results of the first means for summing, the second means for summing and the means for generating a number corresponding to an expected value.

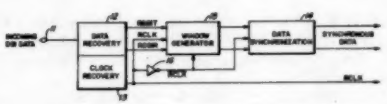
4,716,578
CIRCUIT AND METHOD FOR THE RECOVERY OF DATA FROM A DIGITAL DATA STREAM

Mark S. Wight, Ottawa, Canada, assignor to Northern Telecom Limited, Montreal, Canada

Filed Sep. 29, 1986, Ser. No. 912,481

Int. Cl.⁴ H04L 7/02

U.S. Cl. 375—20 **10 Claims**



4. A method of recovering data from a data stream received at an input data port, the receiving circuitry comprising a clock recovery circuit for deriving clock and inverted clock signals from a data stream appearing at the input port, and a data synchronization circuit responsive to the recovered inverted clock signals and individual pulses from the data stream for providing output pulses each having a width corresponding to that of a recovered clock cycle, the method comprising the step of, at the input of the synchronization circuit, generating in response to each input data pulse and one of the clock signals a recognition window having a maximum width approximately corresponding to that of a clock cycle.

4,716,579

PHASE CORRECTOR

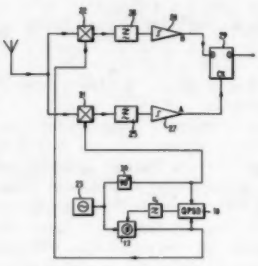
John Masterton, Bishop's Stortford, Great Britain, assignor to STC PLC, London, England

Filed Mar. 6, 1986, Ser. No. 836,797

Claims priority, application United Kingdom, Mar. 7, 1985, 8505923

Int. Cl.[4] H03D *3/00, 3/24*

U.S. Cl. 375—81 **1 Claim**



1. A radio receiver for frequency shift keyed signals on an RF carrier, which comprises first and second paths to which the received radio signals are applied, each said signal path including a mixer circuit followed by a low-pass filter and a limiting amplifier stage, a local oscillator running at the carrier frequency, a first connection from the local oscillator via which the output thereof is applied directly to the mixer circuits of the first of said paths, a second connection from the local oscillator to a quadrature phase shifter the output of which is applied to the mixer circuit of the second of said paths, so that the second mixer circuit receives the local oscillator output with a quadrature phase shift with respect to the first path, a quadrature phase sensitive detector to whose inputs are applied the signal on the first connection from the local oscillator and the output of the quadrature phase shifter, the output from the detector being an error signal if the phase relation is incorrect, which error signal represents the magnitude and sign of the error in phase relation, phase adjusting means responsive to the error signal to adjust the phase of one or both of the locally generated inputs to the mixers in a manner appropriate to the restoration of the correct phase relation, and a D-type clocked flip-flop to the D input of which is applied the output of one of the limiting amplifier stages while the output of the other limiting amplifiers is applied to the clock input of the flip-flop, the output of the flip-flop being the signal modulator in frequency shift keyed manner on to the carrier.

4,716,580

CHARGE TRANSFER ANALOG COMPARATOR AND DEVICES USING SUCH A COMPARATOR

Jean L. Berger, Grenoble, France, assignor to Thomson-CSF, Paris, France

Filed Jun. 18, 1985, Ser. No. 745,883

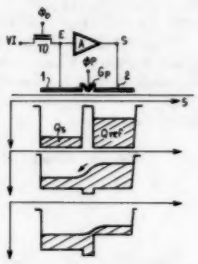
Claims priority, application France, Jun. 26, 1984, 84 10047

Int. Cl.[4] G11C *19/28;* **H01L** *29/78;* **H03M** *1/00;* **H03K** *5/153*

U.S. Cl. 377—62 **15 Claims**

1. A charge transfer analog comparator comprising a pair of metal-insulator semiconductor (MIS) capacitors formed by two portions of a commons substrate separated by a passage channel portion, an insulating layer over the substrate and a pair of electrodes over respective ones of said two portions, and a passage gate electrode overlying the passage channel portion for controllably interconnecting the pair of MIS capacitors,

an amplifier having an input and an output, the input being connected to one of the pair of electrodes, the output to the other of the pair of electrodes, and means for introducing into one of the pair of capacitors a signal charge and into the other of the pair of capacitors a reference charge for comparison with the signal charge, and



means for initiating the comparison connected to the input of the amplifier.

4,716,581

X-RAY EXAMINATION APPARATUS

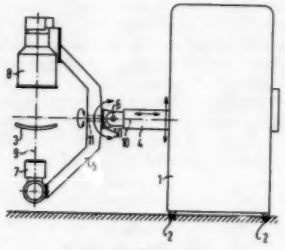
Sigvard Barud, Jaerfaella, Sweden, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Apr. 9, 1985, Ser. No. 721,853

Claims priority, application Fed. Rep. of Germany, Apr. 9, 1984, 3413348

Int. Cl.[4] H05G *1/02*

U.S. Cl. 378—198 **11 Claims**



1. An x-ray examination apparatus, comprising:

a vertically extending stand;

a curved support having a radiation source mounted at one terminating end and an image layer carrier mounted at an opposite terminating end, the radiation source and image layer carrier being aligned to one another so that a central ray from the radiation source will strike the image layer carrier;

support mounting means for connecting the support to the stand for translational and rotational movement of the support relative to the stand; and

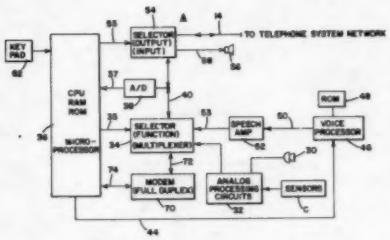
said support mounting means comprising, at its distal end opposite the stand, an end part having a first shaft projecting from one end thereof to which the support is directly mounted and about which the support rotates, a supporting shaft connecting to said stand, and a horizontal second shaft connecting the supporting shaft to the end part and which engages an opposite end of the end part, said second shaft being perpendicular to said first shaft and perpendicular to a direction of said central ray, the end part and the attached support pivoting about said second shaft so that the support pivots in a vertical plane.

4,716,582

DIGITAL AND SYNTHESIZED SPEECH ALARM SYSTEM

Kenneth E. Blanchard, Media, and Stephen V. Sanislo, Jr., Springfield, both of Pa., assignors to Phonetics, Inc., Media, Pa. and Wisconsin Bell, Inc., Milwaukee, Wis.

Continuation-in-part of Ser. No. 792,325, Oct. 28, 1985, which is a division of Ser. No. 488,999, Apr. 27, 1983, Pat. No. 4,558,181.
This application Sep. 16, 1986, Ser. No. 907,997
Int. Cl.[4] H04M *1/24, 11/04*
U.S. Cl. 379—28 4 Claims



1. A portable, self-contained device for monitoring a selected local area, having a standard telephone terminal for connection to a standard external telephone line, said device adapted to report occurrence of any of a plurality of preselected conditions adjacent said local area, said device comprising:

(a) means for setting in said device a first identification number corresponding to a telephone number for the external telephone phone line into said selected local area;

(b) means for selectively connecting said device onto said external telephone line installed at said selected local area;

(c) means for creating in said device a first distinct signal upon occurrence of one of said plurality of preselected conditions;

(d) synthetic speech generator means for generating in said device a first synthetic voice message in response to said distinct signal;

(e) means for amplifying and playing said first synthetic voice message at said local area upon its creation;

(f) means causing said synthetic speech generator to create a first telephone format dialing signal corresponding to a second identification number of a first, remote preselected telephone in response to said distinct signal;

(g) means applying said dialing signal to said external telephone line and thereby initiating a telephone call;

(h) means for creating an answer and handshake present signal upon recognizing the occurrence of an answer and handshake at said first remote telephone;

(i) a modem for creating a telephone compatible digital information signal in response to said answer and handshake present signal, said digital signal including a representation of said first identification number;

(j) switch means directing said digital signal onto said telephone line;

(k) means terminating said telephone call;

(l) means for reobtaining a dial tone when an answer and handshake present signal is not generated and cycling means for repeatedly creating said first dialing signal and seeking an answer and handshake at said first remote telephone for a preselected period of time;

(m) means responsive to the absence of said answer and handshake present signal for said preselected period of time causing said synthetic speech generator to create a second telephone format dialing signal corresponding to the identification number of a second, remote preselected telephone;

(n) means applying said second dialing signal to said external telephone line and thereby initiating a telephone call;

(o) means creating an answer signal upon recognizing the occurrence of an answer at said second remote telephone;

(p) preprogrammed means creating a digital compatible indicator signal if said second preselected telephone is capable of the receipt of digital information;

(q) means creating a handshake present signal if a digital handshake is received from said second remote telephone;

(r) means activating said switch means for directing said digital signal to said telephone line if said handshake present signal is present; and

(s) means causing said synthetic speech generator to create a second synthetic voice signal in response to the absence of said digital compatible indicator signal, said second synthetic voice signal includes a representation of said first identification number and means applying said second synthetic voice signal to said telephone line.

3. A method for monitoring a selected local area with a device having a standard telephone terminal connected to standard external telephone lines of a standard commercial telephone network for occurrence of any of a plurality of preselected conditions adjacent said local area, said method comprising:

(a) setting a first identification code in said device corresponding to a telephone number for said standard external telephone lines into said selected local area;

(b) automatically answering a telephone call directed to said device on said standard external telephone lines;

(c) determining if a digital communications format handshake is present on said external telephone lines and creating a handshake present signal in response thereto;

(d) in the absence of a handshake present signal, creating a synthetic speech message including information corresponding to an identification code for said local area external telephone lines and information on the status of said preselected conditions, applying said synthetic speech message to said external telephone lines as intelligence and terminating said telephone call;

(e) in the presence of a handshake present signal, determining if a data command is present on said external telephone lines and generating a data command present signal in the presence of such command;

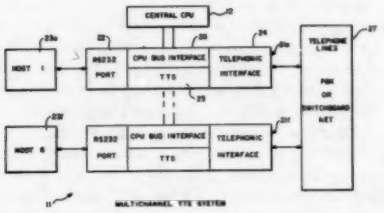
(f) in the absence of a data command present signal, creating a digitally encoded telephone system acceptable message including an identification code for said local area external telephone lines and the status of said preselected conditions, masking references to alarm conditions reported and terminating said telephone call;

(g) in the presence of a data command present signal, terminating said telephone call, initiating a second telephone call by creating and applying to said external telephone lines a telephone format dialing signal corresponding to an identification code of a remote preselected telephone connected to said commercial telephone network, determining whether an answer and digital handshake is present on said external telephone lines and creating an answer and handshake present signal in the presence thereof; in the presence of said answer and handshake present signal, applying said digitally encoded telephone system acceptable message to said external telephone lines, masking references to alarm conditions reported and disconnecting said second telephone call; in the absence of said answer and handshake present signal, terminating said second telephone call and reapplying said telephone format dialing signals to said external telephone line seeking an answer and handshake present signal.

4,716,583
VERBAL COMPUTER TERMINAL SYSTEM

Gabriel F. Groner; Eric A. Dorsey, both of Palo Alto; Keith M. Williams, San Francisco, and Harihar J. Vyas, San Jose, all of Calif., assignors to Speech Plus, Inc., Mountain View, Calif.

Continuation of Ser. No. 552,292, Nov. 16, 1983, Pat. No. 4,659,877. This application Oct. 22, 1986, Ser. No. 907,458
The portion of the term of this patent subsequent to Apr. 21, 2004, has been disclaimed.
Int. Cl.[4] H04M *11/00*
U.S. Cl. 379—88 **12 Claims**



1. A communications system for verbal telephonic communication of textual data in remote computer systems, comprising:

(a) text-to-speech (TTS) means for translating digitally stored textual data into analogue speech signals corresponding to the verbal expression of said textual data;

(b) telephone call handling means for initiating telephone calls and receiving data requests from the telephone answerer, including

means for initiating a telephone call and establishing a telephonic connection with the answerer; and

instruction means for receiving and interpreting instructions from said answerer, said instructions including commands specifying what data to retrieve;

(c) data base access means for accessing a data base in a separate computer system, including

means for establishing a connection with a separate computer system;

means for emulating a computer terminal suitable for communication with said separate computer system; and

means for requesting and receiving data from a data base in said separate computer system; and

(d) data delivery means, including

means, responsive to said instructions from said answerer, for extracting a portion of said data, wherein said portion of said data is selected in accordance with said instructions received from said answerer; and

means for routing said portion of said data to said TTS means for translation thereby; and

means for routing said speech signals from said TTS means to said answerer by means of said telephonic connection.

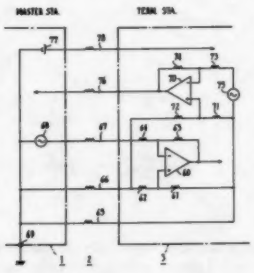
4,716,584
NOISE-FREE TERMINAL STATION COMPATIBLE WITH EXISTING MASTER STATIONS

Hisashi Fujisaki, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed May 23, 1986, Ser. No. 866,519
Claims priority, application Japan, May 24, 1985, 60-111915
Int. Cl.[4] H04M *1/74*
U.S. Cl. 379—176 **3 Claims**

1. A terminal-station apparatus adapted to operate with a current supplied from a master-station apparatus for receiving a first signal from and transmitting a second signal to the master-station apparatus through cable conductors, one of said cable conductors being a ground conductor through which the current returns from said terminal-station apparatus to ground at said master-station apparatus, producing a reference potential at said ground and a noise-generating potential at the terminal-station end of said ground conductor, comprising:

receive means having a first differential amplifier and a first resistor network connected in a balanced relationship to input terminals of said first differential amplifier for receiving said first signal in a noise-cancelling relationship with respect to said reference potential to eliminate the effect of said noise-generating potential at the output of said first differential amplifier, said input terminals of said first differential amplifier being coupled through said first resistor network over first and second conductors to said master-station apparatus; and

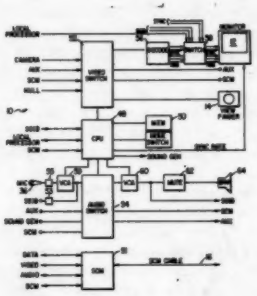


transmit means having a second differential amplifier and a second resistor network connected in a balanced relationship to input terminals of said second differential amplifier for transmitting said second signal therefrom in a noise-cancelling relationship with respect to said reference potential to eliminate the effect of said noise-generating potential at the output of said second differential amplifier, an output terminal of said second differential amplifier being connected over a third conductor to said master-station apparatus and one of said input terminals of said second differential amplifier being coupled through said second resistor network to said first conductor.

4,716,585
GAIN SWITCHED AUDIO CONFERENCING NETWORK

E. Neil Tompkins, and Jack N. Bartholmae, both of San Antonio, Tex., assignors to Datapoint Corporation, San Antonio, Tex.

Filed Apr. 5, 1985, Ser. No. 720,507
Int. Cl.[4] H04M *3/56*
U.S. Cl. 379—202 **22 Claims**



1. A conferencing system for communicating between remote stations, comprising:

a transmission medium associated with each of the remote stations for carrying audio signals;

microphone means disposed at each of the remote stations

for receiving audio information from said associated transmission medium;

speaker means at each of the remote stations for outputting audio signals to said associated transmission medium;

said associated transmission providing a feedback path between said microphone and speaker means;

communication link means for providing a first audio path between said microphone means at one of the remote stations and said speaker means at selected ones of the remaining remote stations;

said communication link means providing a second audio path between said microphone means at each of the selected remaining remote stations and said speaker means at the one remote station, said first and second audio paths being isolated; and

loop gain means for inserting loss in the audio path at each of the remote points such that the audio level of received audio from said communication link means that is transmitted from said speaker means to the associated on of said microphone means and transmitted to said communication link means is decreased to prevent oscillation, said inserting means adjusted as a function of the input signal level to said microphone means, said inserting means comprising:

level control means for selecting a desired level for output from said speaker means;

microphone loss means disposed between said microphone means and the audio output of the associated remote station for selectively inserting a first predetermined amount of loss into the audio loop; speaker loss means disposed between said speaker means and the input of the associated remote station for selectively inserting a second predetermined amount of loss into the audio loop;

voice detect means for generating a voice detect signal when the input level to said microphone means exceeds a predetermined threshold; and

loop control means for activating said microphone loss means in a first mode and activating said speaker loss means in a second mode, said loop control means operating in said first mode in the absence of said detect signal and in said second mode when said voice detect signal is present, said control means inhibited from operating in either said first or second mode when the desired output level of said level control means is less than a predetermined level threshold;

said first predetermined amount of loss in said microphone loss means being a function of the setting of said level control means such that the loss inserted increases as the desired level set by said level control means increases above said predetermined level threshold.

4,716,586

STATE SEQUENCE DEPENDENT READ ONLY MEMORY

Jerry R. Bauer, San Jose, Calif., assignor to American Microsystems, Inc., Santa Clara, Calif.

Continuation of Ser. No. 559,155, Dec. 7, 1983, abandoned. This application Oct. 17, 1986, Ser. No. 920,935

Int. Cl.[4] H04L *9/00*

U.S. Cl. 380—3 **7 Claims**

1. A state sequence dependent memory device comprising:

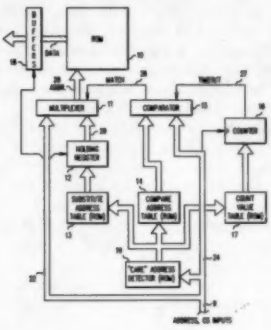
an input transfer path;

an output transfer path;

means for providing data which receives instantaneous addresses from said input transfer path and provides data on said output trasnfer path;

a key address detector which receives said instantaneous addresses from said input transfer path and detects when said instantaneous addresses are equal to certain key addresses, and in response to detection of any one of said key addresses provides an output signal:

timing means which receives said instantaneous addresses from said input transfer path and said output signal from said key address detector, is enabled by said output signal from said key address detector to count said instantaneous addresses and upon reaching a predefined count provides a timing signal to said means for providing data; and



means for supplying incorrect data to be sent on said output transfer path if said instantaneous address does not match a stored address when said timing signal is received by said means for providing data, connected to said key address detector and to said means for providing data.

4,716,587

BROADBAND-SIGNAL BROADCASTING SYSTEM

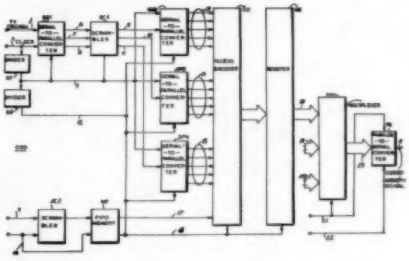
Alfredo Fausone, Ivrea, and Agostino Moncalvo, Turin, both of Italy, assignors to CSELT - Centro Studi e Laboratori Telecomunicazioni S.p.A., Turin, Italy

Filed May 8, 1986, Ser. No. 861,074

Claims priority, application Italy, Jun. 3, 1985, 67509 A/85

Int. Cl.[4] H04N *7/167*

U.S. Cl. 380—10 **3 Claims**



1. A broadband broadcasting system having video signals and audio signals originating from various sources, said video signals and said audio signals being processed by said broadcasting system, each of said audio signals having an audio frequency and each of said video signals having a video frequency, said video signals and said audio signals being decoded by subscribers connected in said system by a decoding circuit, said broadcasting system comprising:

a first serial-to-parallel converter having a first input and forming at least one output;

a first clock coupled to said first serial-to-parallel converter forming a first clock signal with a first clock frequency equal to said video frequency, wherein said first clock signal controls loading of said first serial-to-parallel converter at said first input with said video signal;

a first frequency divider coupled to said first clock and said first serial-to-parallel converter, for dividing said first clock signal forming a second clock signal for controlling reading of said serial-to-parallel converter;

a first scrambler coupled to said output of first serial-to-parallel converter;

a second frequency divider coupled to said first frequency divider and forming a third clock signal;

a first converting means comprising at least one serial-to-parallel converter for each output of said first serial-to-parallel converter, coupled to said first frequency divider, said first scrambler and said second frequency divider, wherein said third clock signal controls reading of said converting means;

a second scrambler receiving said audio signals;

a first memory coupled to said second scrambler, wherein said audio frequency controls loading of said first memory and said third clock signal controls reading of said first memory;

an encoding means coupled to said first memory and said converting means for channel encoding said video and said audio signals;

a register coupled to said encoding means, said first memory and said third clock signal for storing an output of said encoding means;

a multiplexer coupled to said register for combining said output of said register into parallel flow and a frame alignment word;

a parallel-to-serial converter coupled to said multiplexer forming a digital TV signal, under serial form with channel encoding; and

a switching matrix coupled to said parallel-to-serial converter for selection of television channels by said subscribers.

4,716,588

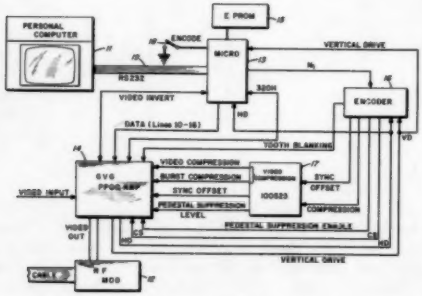
ADDRESSABLE SUBSCRIPTION TELEVISION SYSTEM HAVING MULTIPLE SCRAMBLING MODES

John R. Thompson, La Quinta; Curtis J. Hunting, Altadena; Ronald K. Masson, Topanga, and Craig E. Trivelpiece, Irvine, all of Calif., assignors to Payview Limited, Hong Kong

Filed Oct. 29, 1985, Ser. No. 792,704

Int. Cl.[4] H04N 7/167

U.S. Cl. 380—20 **22 Claims**



1. A method for scrambling a video signal, said video signal including a plurality of sequential fields, each field having a plurality of active line portions preceded by a horizontal synchronization period comprising:

removing horizontal synchronization pulses from said synchronization period;

compressing the amplitude of said active line portions;

adding a psuedo synchronization pulse having an amplitude greater than said removed synchronization pulse to said synchronization period from which said horizontal synchronization pulses were removed, said pseudo synchronization pulse leading edge occurring at a time different than that of said removed synchronization pulse;

changing the position of said pseudo synchronization pulses leading edge in subsequent fields; and;

adding an offset voltage to said video signal during the active line period of said video signal.

4,716,589

MULTIVOICE SIGNAL SWITCHING CIRCUIT

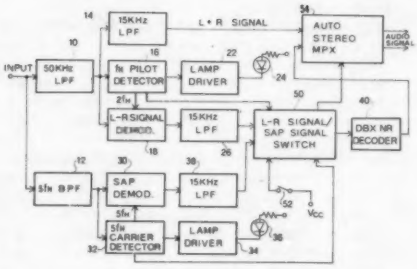
Toshiya Matsui, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Nov. 26, 1985, Ser. No. 801,714

Claims priority, application Japan, Nov. 26, 1984, 59-179101[U]

Int. Cl.[4] H04H 5/00

U.S. Cl. 381—3 **24 Claims**



1. A multivoice signal switching circuit for treating a multivoice signal including a main channel and first and second subchannels, the first subchannel being assigned to stereophonic information and the second subchannel being assigned to second language information, comprising means receiving a control signal for selectively outputting one of the first and second subchannel signals extracted from said multivoice signal, means for sensing the second subchannel signal, and means connected to the sensing means and for controlling the selectively outputting means so as to force said selectively outputting means to a condition of outputting the first subchannel signal irrespective of the control signal, when the second subchannel signal cannot be sensed.

4,716,590

AM STEREO TRANSMISSION METHOD AND APPARATUS

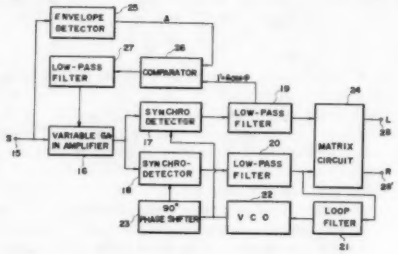
Susumu Takahashi, and Hiroshi Iida, both of Tokyo, Japan, assignors to Sansui Electric Co., Ltd., Tokyo, Japan

Filed Jan. 16, 1985, Ser. No. 691,793

Claims priority, application Japan, Jan. 17, 1984, 59-6174; Nov. 19, 1984, 59-176123[U]; Nov. 19, 1984, 59-176124[U]; Nov. 19, 1984, 59-176125[U]

Int. Cl.[4] H04H 5/00

U.S. Cl. 381—15 **9 Claims**



1. A demodulator for AM stereo signals, comprising:

an amplitude controller for receiving an AM signal $S=A\cos$

($\omega t+\phi$), wherein A represents an amplitude, ω a carrier angular frequency, and $\phi=\tan^{-1}(L-R)/1+L+R$ a phase angle;

an orthogonal demodulator for orthogonally demodulating the output of the amplitude controller;

a matrix circuit for deriving left and right audio signals L and R from sum and difference signals (L+R) and (L−R) obtained by the orthogonal demodulator;

an amplitude control signal generator circuit for producing a control signal to control the amplitude controller, and

a low-pass filter for passing said control signal to said amplitude controller, wherein when the received AM stereo signal S is equal to $(1+L+R)\cos(t+\phi)$, the amplitude of the AM stereo signal S is changed by said amplitude controller in response to said control signal to

$$\sqrt{(1+L+R)^2+(L-R)^2}\ \cos(\omega t+\phi).$$

4,716,591

SPEECH SYNTHESIS METHOD AND DEVICE

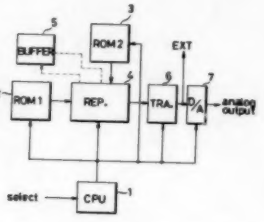
Sigeaki Masuzawa, Nara; Shinya Shibata, Yamatokoriyama; Hiroshi Miyazaki, and Tetsuo Iwase, both of Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 577,482, Apr. 6, 1984, abandoned, which is a continuation of Ser. No. 398,906, Jul. 16, 1982, abandoned, which is a continuation of Ser. No. 123,065, Feb. 20, 1980, abandoned. This application Nov. 8, 1985, Ser. No. 795,760

Claims priority, application Japan, Feb. 20, 1979, 54-19309

Int. Cl.⁴ G10L *5/00*

U.S. Cl. 381—51 **2 Claims**



1. A method for synthesizing speech waveforms comprising the steps of:

(a) storing digital speech information designating speech phonemes in a first addressable memory;

(b) storing in a second addressable memory digital compression command information in a normalized form, said compression command information being capable of modifying the phonemes at least with respect to pitch cycle and amplitude and reading said phonemes out of said first memory means either selectively or sequentially;

(c) reading out the compression command information in the normalized form from said second memory;

(d) decoding the normalized form of said compression command information into the actual digital form;

(e) modifying said phonemes using the actual digital form of said compression command information to form continuously digitalized synthetic speech waveforms;

(f) converting the digitalized synthetic speech waveforms into analog waveforms; and

(g) quantizing said continuously digitalized synthetic waveform at predetermined spaced sampling times, computing the average value of the waveform between adjacent spaced sampling times, interleaving said average values into said waveform between said adjacent spaced sampling times to generate a composite quantized digital waveform and converting said composite quantized digital waveform into an analog waveform.

4,716,592

METHOD AND APPARATUS FOR ENCODING VOICE SIGNALS

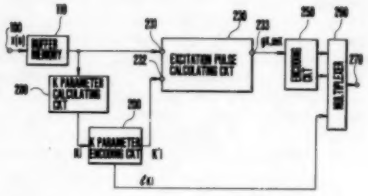
Kazunori Ozawa, and Takashi Araseki, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Dec. 27, 1983, Ser. No. 565,804

Claims priority, application Japan, Dec. 24, 1982, 57-231603; Dec. 24, 1982, 57-231605; Dec. 24, 1982, 57-231606

Int. Cl.⁴ G10L *5/00*

U.S. Cl. 381—40 **5 Claims**



1. An apparatus for encoding voice signals comprising:

means inputted with a discrete voice signal series for dividing said voice signal series at each time interval to obtain a time interval voice signal series;

means for extracting a parameter representative of a spectrum envelope from said time interval voice signal series and encoding the parameter;

means for calculating an impulse response series based on said parameter representative of said spectrum envelope;

means for calculating an autocorrelation function sequence of said impulse response series;

means for calculating a cross-correlation function sequence between said impulse response series and said time interval voice signal series;

means for calculating and encoding an excitation signal series of said time interval voice signal series by using said autocorrelation function sequence and said cross-correlation function sequence; and

means for combining and outputting a code of said parameter representative of said spectrum envelope and a code representative of said excitation signal series.

4,716,593

IDENTITY VERIFICATION SYSTEM

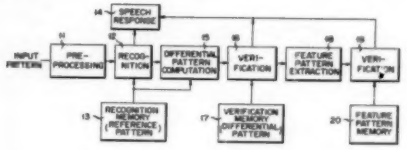
Shoichi Hirai, Yokohama, and Sadakazu Wetanabe, Kawasaki, both of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Jun. 17, 1983, Ser. No. 505,496

Claims priority, application Japan, Jun. 25, 1982, 57-109527

Int. Cl.⁴ G10L *5/00*

U.S. Cl. 381—42 **2 Claims**



1. An identity verification system comprising:

speech input means for providing input speech pattern data from utterances of a speaker:

first memory means for storing speech reference pattern data

for each of categories prepared from speech pattern data obtained by utterances of a plurality of speakers;

similarity computing means responsive to said speech input means and said first memory means for computing similarities between said input speech pattern data and said reference pattern data for each of categories and recognizing the category of utterance of the speaker from the computed similarities;

second memory means for storing speech reference differential pattern data and reference vector pattern data of each of specific speakers for categories, said speech reference differential pattern data of a speaker being prepared by a difference between an input speech pattern of the speaker for a category and speech reference pattern data of the same speaker for the same category as the input speech pattern the speech reference feature vector pattern data being extracted from the speech reference differential pattern data for each of the specific speakers;

speech differential pattern computing means responsive to said speech input means and said first memory for computing differential pattern data indicative of a difference between speech input pattern data obtained through said speech input means by a speaker claiming identify verification and speech refernce pattern data of the same category as the input speech pattern whose category has been recognized by said similarity computing means;

identity verification means responsive to said second memory means and said speech differential pattern computing means for comparing the speech differential pattern data provided by said speech differential pattern computing means with the speech reference differential pattern data of the recognized category stored in said second memory means to verify the speaker claiming identity verification; and

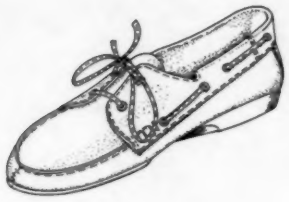
feature vector pattern extracting means responsive to said speech differential pattern computing means for extracting feature vector pattern data from the speech differential pattern data of the speaker claiming identity verification computed by said speech differential pattern computing means; and wherein

said identity verification means is arranged to perform speaker identity verification, in a first stage, on the basis of the speech differential pattern data, and, in a second stage, on the basis of the feature vector pattern data when the first stage identity verification is difficult.

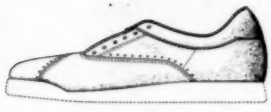
DESIGNS

DECEMBER 29, 1987

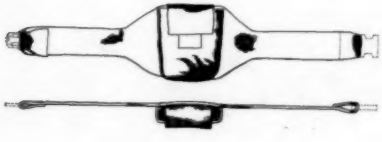
293,385
SHOE
Leo H. Famolare, Kennebunkport, Me., assignor to Wolverine World Wide, Inc., Rockford, Mich.
Filed Mar. 18, 1985, Ser. No. 713,043
Term of patent 14 years
U.S. Cl. D2—287



293,386
SHOE UPPER
Brenda C. Kelley, Beaverton, Oreg., assignor to Pensa, Inc., Portland, Oreg.
Filed Apr. 4, 1986, Ser. No. 847,882
Term of patent 14 years
U.S. Cl. D2—314



293,387
KNAPSACK BELT
Richard S. Wagner, II, Cincinnati, Ohio, assignor to Tune Belt, Inc., Cincinnati, Ohio
Filed May 17, 1985, Ser. No. 735,051
Term of patent 14 years
U.S. Cl. D2—630



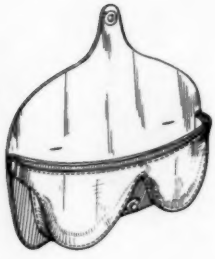
293,388
UMBRELLA HANDLE
John L. Susan, 1819-9th St., Rockford, Ill. 61108
Filed Feb. 18, 1985, Ser. No. 700,114
Term of patent 14 years
U.S. Cl. D3—12

293,389

SPECTACLES CASE WITH EXTERNAL POCKETS FOR SPARE GLASSES

Alberto Vitaloni, Turin, Italy, assignor to Vitaloni S.p.A., Beinasco, Italy

Filed May 7, 1985, Ser. No. 731,305
Term of patent 14 years
U.S. Cl. D3—34

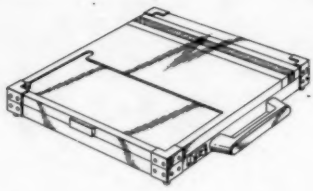


293,390

MAGAZINE FOR SUPPLYING FILM FOR A PRINTER

Masatoki Sutou, Okazaki; Yutaka Maeda, Machida, both of Japan; Walter F. Anderson, Jr., Minneapolis, and James W. Kochevar, Shoreview, both of Minn., assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan and Minnesota Mining and Manufacturing Company (3M), St. Paul, Minn.

Filed May 22, 1985, Ser. No. 736,714
Claims priority, application Japan, Nov. 22, 1984, 59-48258
Term of patent 14 years
U.S. Cl. D3—35

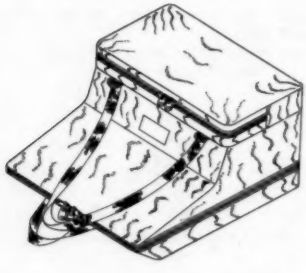


293,391

COMPUTER TOTE BAG

Robert H. Preston, 6909 Quail Pl., Unit F, La Costa, Calif. 92009

Filed Sep. 6, 1984, Ser. No. 647,657
Term of patent 14 years
U.S. Cl. D3—71



293,392

PURSE ATTACHMENT FOR BELT

Marilyn R. Lindon, Los Angeles, Calif., assignor to La Cle, Beverly Hills, Calif.

Filed Jul. 2, 1984, Ser. No. 626,978

Term of patent 14 years

U.S. Cl. D3—106

293,393

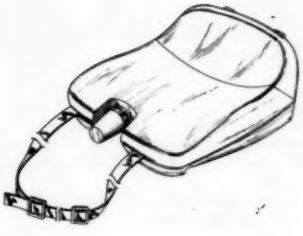
COMBINED SEAT AND CONTAINER

Eugene L. Bothun, Loveland, and Michael C. McGuire, Littleton, both of Colo., assignors to Sit-N-Sip, Inc., Huntington Beach, Calif.

Filed May 14, 1985, Ser. No. 733,937

Term of patent 14 years

U.S. Cl. D6—335



293,394

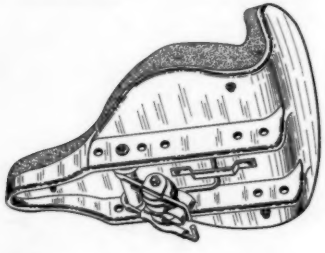
ANATOMIC CYCLE SEAT FOR RELIEVING PELVIC PRESSURE

Stephen A. Holcomb, P.O. Box 1389, Santa Maria, Calif. 93455

Filed Oct. 24, 1985, Ser. No. 791,135

Term of patent 14 years

U.S. Cl. D6—354



293,395

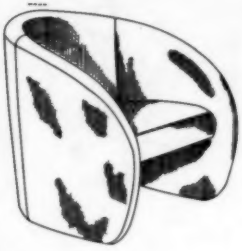
SEAT

Jochen Hoffmann, Memmertweg 28, 4800 Bielefeld 16, Fed. Rep. of Germany

Filed Jun. 6, 1985, Ser. No. 741,908

Term of patent 14 years

U.S. Cl. D6—375



293,396

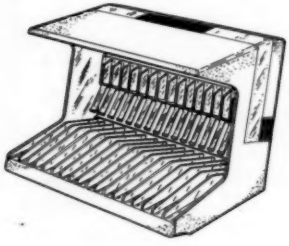
COMPACT DISK STORAGE UNIT

James A. Womack, Fremont, and Peter J. Palmer, San Jose, both of Calif., assignors to Innovative Concepts, Inc., San Jose, Calif.

Filed May 17, 1985, Ser. No. 735,827

Term of patent 14 years

U.S. Cl. D6—407



293,397

ADJUSTABLE TABLE

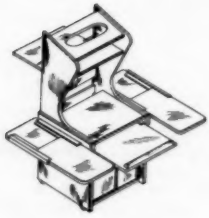
William G. Hunt, 1210 E. Main St., Sunset Beach, N.C. 28459

Filed Jun. 17, 1985, Ser. No. 745,505

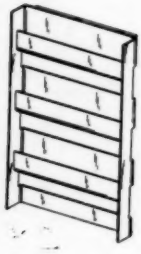
Term of patent 14 years

U.S. Cl. D6—429

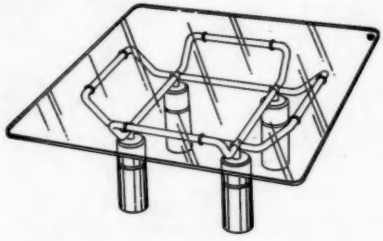
293,398
MOBILE PERSONAL COMPUTER WORKSTATION
Gordon F. Kwiecinski, Cincinnati, Ohio, assignor to Hamilton Sorter Co., Inc., Fairfield, Ohio
Filed May 3, 1985, Ser. No. 730,469
Term of patent 14 years
U.S. Cl. D6—430



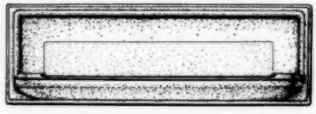
293,399
DISPLAY CASE FOR GREETING CARDS
John P. Persitza, 1400 E. Belleview Pl., Milwaukee, Wis. 53211
Filed Apr. 25, 1985, Ser. No. 726,994
Term of patent 14 years
U.S. Cl. D6—468



293,400
TABLE
Michael M. Stewart, Toronto, Canada, assignor to Ambiant Systems Limited, Toronto, Canada
Filed Apr. 22, 1985, Ser. No. 725,442
Claims priority, application Canada, Mar. 19, 1985, 19-03-85-1
Term of patent 14 years
U.S. Cl. D6—487



293,401
SHOWER STALL SOAP DISH
John W. Moore, St. Louis County, Mo., assignor to The Swan Corporation, St. Louis, Mo.
Filed Jul. 12, 1985, Ser. No. 754,167
Term of patent 14 years
U.S. Cl. D6—540



293,402

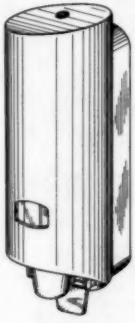
DISPENSER HOUSING FOR LIQUIDS

Tor Petterson, Palos Verdes, Calif., assignor to James River Corporation of Nevada, San Francisco, Calif.

Filed Apr. 25, 1986, Ser. No. 857,773

Term of patent 14 years

U.S. Cl. D6—545



293,403

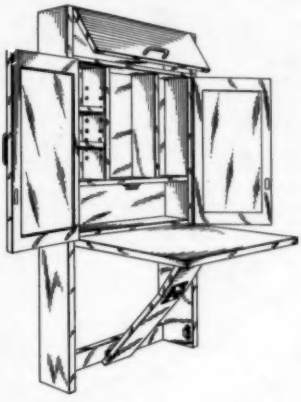
WALL MOUNTED VANITY

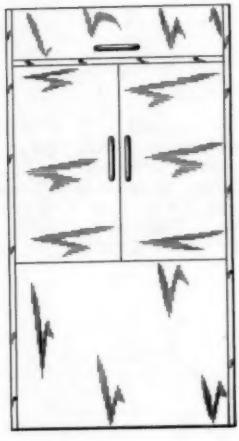
Martin Umanoff, 26 Windsor Rd., Great Neck, N.Y. 11021, and Chris W. Buehl, 7 Pine Dr., Port Washington, N.Y. 11050

Filed Dec. 23, 1986, Ser. No. 946,285

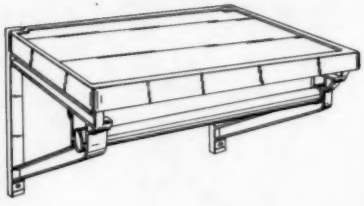
Term of patent 14 years

U.S. Cl. D6—555





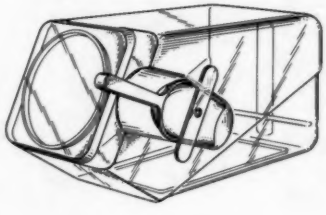
293,404
WALL-MOUNTED SHELF AND ROD COMBINATION
Kent W. Murphy, Wooster, Ohio, assignor to Rubbermaid Incorporated, Wooster, Ohio
Filed Nov. 29, 1985, Ser. No. 807,048
Term of patent 14 years
U.S. Cl. D6—574



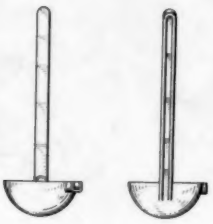
293,405
DECALCOMANIA OR THE LIKE FOR CHINA DINNERWARE
Helen Zughaib, Syracuse, N.Y., assignor to Syracuse China Corporation, Syracuse, N.Y.
Filed Mar. 15, 1985, Ser. No. 712,075
Term of patent 14 years
U.S. Cl. D7—39

293,406
DECALCOMANIA OR THE LIKE FOR CHINA DINNERWARE
Jeanette Mattson, Syracuse, N.Y., assignor to Syracuse China Corporation, Syracuse, N.Y.
Filed Mar. 15, 1985, Ser. No. 712,076
Term of patent 14 years
U.S. Cl. D7—39

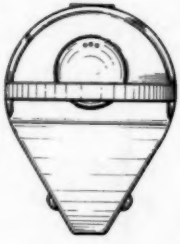
293,407
COMBINATION FOOD CONTAINER AND SCOOP
Peter Edwards, Hayward; Budd Steinhilber, Stinson Beach, and Ken Gilliam, San Francisco, all of Calif., assignors to Harmony Foods, Inc., Santa Cruz, Calif.
Filed Jan. 30, 1986, Ser. No. 824,077
The portion of the term of this patent subsequent to Dec. 22, 2001, has been disclaimed.
Term of patent 14 years
U.S. Cl. D7—79

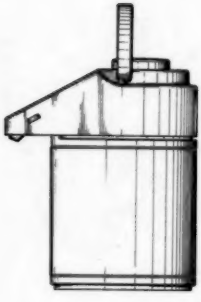


293,408
PUNCH LADLE
Erik L. Hansen, Roskilde, Denmark, assignor to Rosti A/S, Denmark
Filed May 8, 1985, Ser. No. 731,798
Term of patent 14 years
U.S. Cl. D7—104



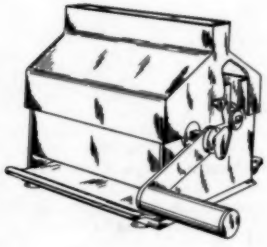
293,409
ELECTRIC INSULATED BEVERAGE DISPENSER OR THE LIKE
Seishin Seike, Osaka, Japan, and Mario Bellini, Rotterdam, Netherlands, assignors to Zojurushi Vacuum Bottle Co., Ltd., Osaka, Japan
Filed Nov. 1, 1984, Ser. No. 667,311
Claims priority, application Japan, May 1, 1984, 59-017976
Term of patent 14 years
U.S. Cl. D7—313





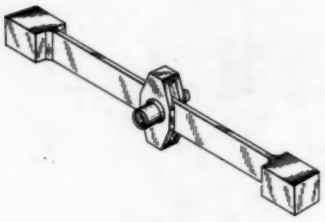
293,410
MICROWAVE OVEN
Hiroshi Moritani, Osaka, Japan, assignor to Sharp Corporation, Osaka, Japan
Filed Feb. 19, 1985, Ser. No. 703,107
Term of patent 14 years
U.S. Cl. D7—351

293,411
MEAT TENDERIZER
Rosalie J. Dickey, 7814 Old Harford Rd., Baltimore, Md. 21234
Filed Jul. 20, 1984, Ser. No. 632,647
Term of patent 14 years
U.S. Cl. D7—382

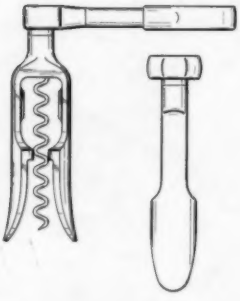


293,412
SPADE
Celso S. Gonzales, 245 Bennett Ave., Apt. 3-E, New York, N.Y. 10040
Filed Jan. 4, 1985, Ser. No. 688,823
Term of patent 14 years
U.S. Cl. D8—10

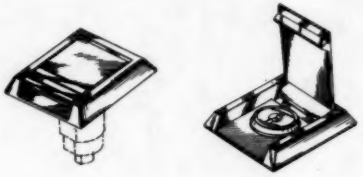
293,413
IMPACT LUG WRENCH
Melverton R. Witbeck, 3867 Meadowlawn Loop SE, No. 4, Salem, Oreg. 97301
Filed Feb. 19, 1987, Ser. No. 703,186
Term of patent 14 years
U.S. Cl. D8—27



293,414
CORKSCREW
Herbert Allen, Houston, Tex., assignor to Hallen Company, Houston, Tex.
Filed Apr. 23, 1985, Ser. No. 726,114
Term of patent 14 years
U.S. Cl. D8—43



293,415
COMBINED LATCH LOCK AND COVER
Warwick M. Whitley, II, Panama City, Fla., assignor to Attwood Corporation, Lowell, Mich.
Filed Sep. 30, 1985, Ser. No. 781,779
Term of patent 14 years
U.S. Cl. D8—346



293,416
TRUSS SPACER OR SIMILAR ARTICLE
Leo J. Krueger, 1045 Alpine Ct., Oshkosh, Wis. 54901
Filed Dec. 9, 1985, Ser. No. 806,373
Term of patent 14 years
U.S. Cl. D8—373

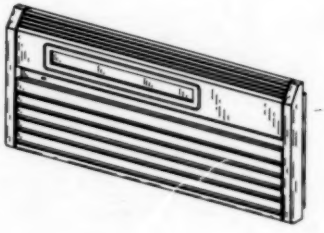
293,417
WATCH CASE
Yasuyuki Sakamaki, Kanagawa, Japan, assignor to Citizen Watch Co., Ltd., Tokyo, Japan
Filed May 17, 1985, Ser. No. 735,808
Term of patent 14 years
U.S. Cl. D10—30

293,418
WRIST WATCH
Yutaka Fukumura, Tokyo, Japan, assignor to Citizen Watch Co., Ltd., Tokyo, Japan
Filed May 17, 1985, Ser. No. 735,803
Term of patent 14 years
U.S. Cl. D10—32

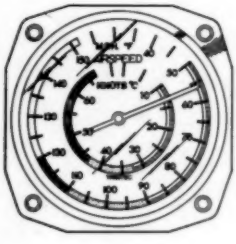
293,419
WATCH CASE
Toshiaki Tanaka, Kanagawa, Japan, assignor to Citizen Watch Co., Ltd., Tokyo, Japan
Filed Aug. 5, 1985, Ser. No. 762,913
Claims priority, application Japan, Apr. 16, 1985, 60-15400
Term of patent 14 years
U.S. Cl. D10—39

293,420
WATCH CASE
Toshiaki Tanaka, Kanagawa, Japan, assignor to Citizen Watch Co., Ltd., Tokyo, Japan
Filed Aug. 1, 1985, Ser. No. 762,923
Claims priority, application Japan, Apr. 16, 1985, 60-15397
Term of patent 14 years
U.S. Cl. D10—39

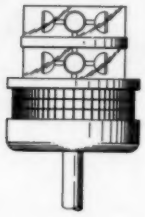
293,421
CONTROLLER FOR AN ENERGY MANAGEMENT SYSTEM
Robert W. Bonnema, Mound; Robert C. Knutson, Minnetonka, and Ralph E. Pasquarette, Jordan, all of Minn., assignors to Honeywell Inc., Minneapolis, Minn.
Filed Oct. 10, 1985, Ser. No. 786,015
Term of patent 14 years
U.S. Cl. D10—50



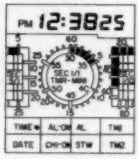
293,422
THERMOMETER
Brendon G. Nunes, 1035 Toy Avenue, Unit 6, Pickering, Ontario, Canada L1W 3N9
Filed Apr. 23, 1987, Ser. No. 41,358
Term of patent 14 years
U.S. Cl. D10—57



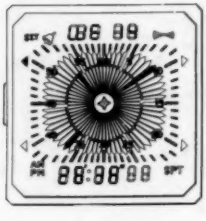
293,423
COMBINED SIGNAL LIGHT AND AUDIBLE ALARM OR SIMILAR ARTICLE
Leonard R. Portillo, 101 Arlington St., Las Vegas, Nev. 89110
Filed Jul. 8, 1985, Ser. No. 752,536
Term of patent 14 years
U.S. Cl. D10—114



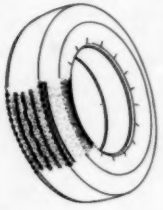
293,424
LIQUID CRYSTAL TIME DISPLAY APPARATUS
Shigeki Yoshikawa, Kanagawa, Japan, assignor to Citizen Watch Co., Ltd., Tokyo, Japan
Filed May 17, 1985, Ser. No. 735,810
Term of patent 14 years
U.S. Cl. D10—125



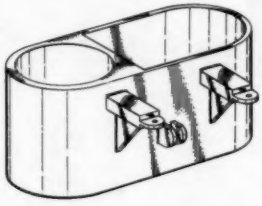
293,425
ELECTROOPTIC DISPLAY FOR A TIMEPIECE
Shinpei Ichikawa, Newbury Park, Calif., assignor to Timex Corporation, Waterbury, Conn.
Filed Aug. 29, 1985, Ser. No. 770,454
Term of patent 14 years
U.S. Cl. D10—125



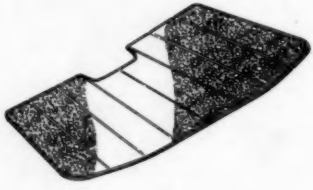
293,426
TIRE FOR AUTOMOBILES
Masahiko Kanamaru, Zushi, and Osamu Takahashi, Hiratsuka, both of Japan, assignors to The Yokohama Rubber Co., Ltd., Tokyo, Japan
Filed Jan. 24, 1985, Ser. No. 694,312
Claims priority, application Japan, Jul. 31, 1984, 57-32396
Term of patent 14 years
U.S. Cl. D12—143



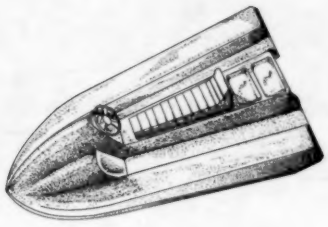
293,427
BICYCLE CARRIER
Malcolm A. Gibbs, Parkhill, Canada, assignor to Twin Star Manufacturing Ltd., Parkhill, Canada
Filed Jun. 27, 1985, Ser. No. 749,521
Term of patent 14 years
U.S. Cl. D12—158



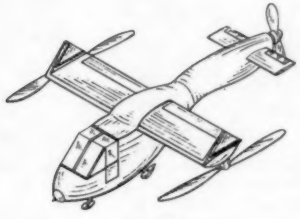
293,428
VEHICLE SUN SHIELD
G. Mitchell Watts, San Luis Obispo, Calif., assignor to New World Products Corporation, San Luis Obispo, Calif.
Filed Apr. 26, 1985, Ser. No. 727,787
Term of patent 14 years
U.S. Cl. D12—191



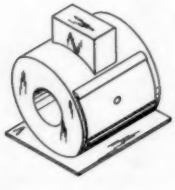
293,429
BOAT
Eugene Franyutti, and Juan Franyutti, both of 7814 Fortune Dr., San Antonio, Tex. 78280
Filed Oct. 20, 1986, Scr. No. 920,890
Term of patent 14 years
U.S. Cl. D12—307



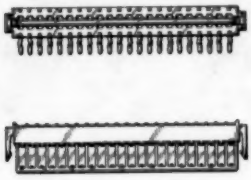
293,430
PERISTROPHIC-WING AIR CRAFT
Theodore Koutsoupidis, Kecropos 39, Glyfada, Athens 166-75, Greece
Filed May 16, 1986, Ser. No. 864,112
Term of patent 14 years
U.S. Cl. D12—338



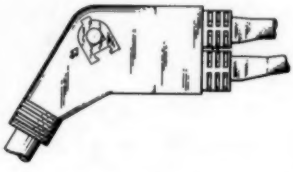
293,431
CURRENT TRANSFORMER
David N. Makinson, Franklin, N.C., and Karl W. Struck, Clayton, Ga., assignors to Sangamo Weston, Inc., Norcross, Ga.
Division of Ser. No. 595,178, Mar. 30, 1984, Pat. No. Des. 288,314. This application Nov. 10, 1986, Ser. No. 928,375
Term of patent 14 years
U.S. Cl. D13—4



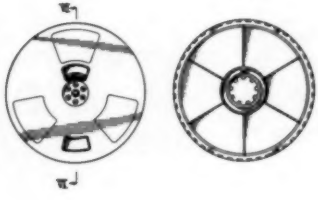
293,432
ELECTRICAL CONNECTING PLUG
Toru Masuda, Osaka, Japan, assignor to Hosiden Electronics Co., Ltd., Japan
Filed Apr. 2, 1985, Ser. No. 719,393
Claims priority, application Japan, Oct. 3, 1984, 59-41345
Term of patent 14 years
U.S. Cl. D13—24



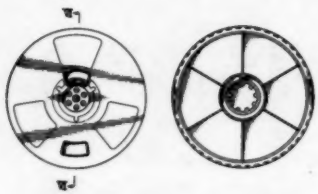
293,433
VEHICLE WIRING HARNESS CONNECTOR
Gary W. Brooks, North Vernon, Ind., and Victor Mastis, Hinsdale, Ill., assignors to The Grote Manufacturing Company, Inc., Madison, Ind.
Filed Jul. 27, 1984, Ser. No. 635,208
Term of patent 14 years
U.S. Cl. D13—24



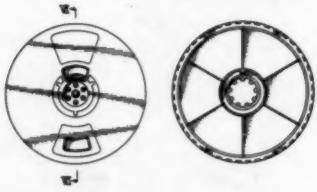
293,434
REEL FOR VIDEO TAPE
Koji Maeda, Osaka, Japan, assignor to Video Eico IPD Co., Ltd., Osaka, Japan
Filed Jan. 3, 1985, Ser. No. 688,655
Claims priority, application Japan, Sep. 19, 1984, 59-39398
Term of patent 14 years
U.S. Cl. D14—11



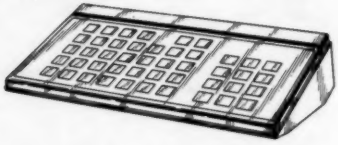
293,435
REEL FOR VIDEO TAPE
Koji Maeda, Osaka, Japan, assignor to Video Eico IPD Co., Ltd., Osaka, Japan
Filed Jan. 3, 1985, Ser. No. 688,498
Claims priority, application Japan, Sep. 19, 1984, 59-39397
Term of patent 14 years
U.S. Cl. D14—11

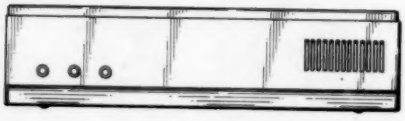


293,436
REEL FOR VIDEO TAPE
Koji Maeda, Osaka, Japan, assignor to Video Eico IPD Co., Ltd., Osaka, Japan
Filed Jan. 3, 1985, Ser. No. 688,499
Claims priority, application Japan, Sep. 19, 1984, 59-39399
Term of patent 14 years
U.S. Cl. D14—11

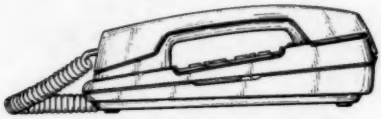


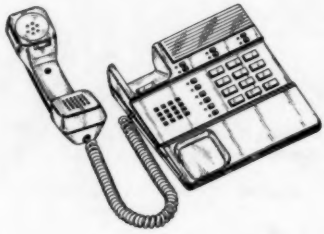
293,437
OPERATION MACHINE CONSOLE FOR TELEPHONE INFORMATION
Naoko Hoshino, Chiba, and Yosuke Suzuki, Yokohama, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Jun. 7, 1985, Ser. No. 742,235
Claims priority, application Japan, Dec. 24, 1984, 59-52700
Term of patent 14 years
U.S. Cl. D14—52



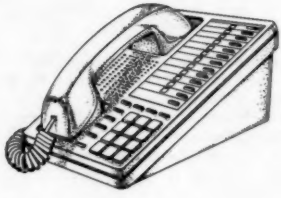


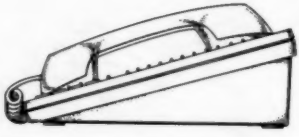
293,438
TELEPHONE
Makoto Ishimaru, Tokyo, Japan, assignor to Kanda Tsushin Kogyo Co., Ltd., Tokyo, Japan
Filed Sep. 26, 1985, Ser. No. 780,385
Claims priority, application Japan, Apr. 10, 1985, 60-14548
Term of patent 14 years
U.S. Cl. D14—58





293,439
TELEPHONE SET
David A. Nogas, Ottawa, Canada, assignor to Mitel Corporation, Ontario, Canada
Filed Mar. 14, 1986, Ser. No. 844,738
Claims priority, application Canada, Jan. 31, 1986, 31-01-86-6
Term of patent 14 years
U.S. Cl. D14—58





293,440

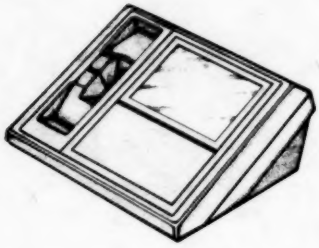
HOUSING FOR HANDSET BASE OF TRANSACTION TELEPHONE OR SIMILAR ARTICLE

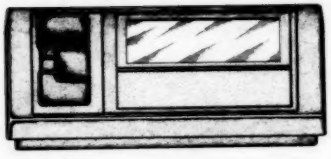
David M. Britz, Rumson, N.J., assignor to American Telephone and Telegraph Company, AT&T Information Systems Inc., both of Murray Hill, N.J.

Filed Feb. 13, 1987, Ser. No. 14,392

Term of patent 14 years

U.S. Cl. D14—60





293,441

TELEPHONE STAND

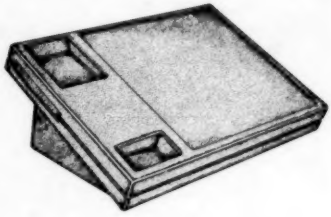
John Kowalik, Freehold; Ronald Longhitano, Oldbridge Township, Middlesex County; Stephen G. Miggels, Wyckoff, and Walter J. Shakespeare, Middletown, all of N.J., assignors to American Telephone and Telegraph Company and AT&T Information Systems Inc., both of Murray Hill, N.J.

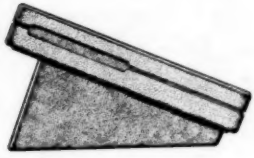
Filed Jun. 19, 1986, Ser. No. 876,384

The portion of the term of this patent subsequent to Dec. 22, 2001, has been disclaimed.

Term of patent 14 years

U.S. Cl. D14—60





293,442

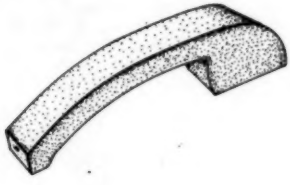
TELEPHONE HANDSET

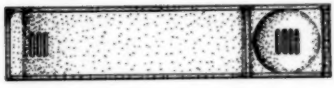
Deane Richardson, Worthington; Gregg Davis, Columbus; Fran Blackman, Dublin, and Peter Koloski, Columbus, all of Ohio, assignors to Trillium Telephone Systems, Inc., Kanata, Canada

Filed Mar. 19, 1986, Ser. No. 845,355

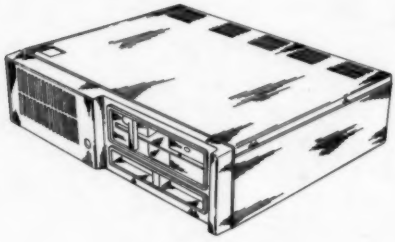
Term of patent 14 years

U.S. Cl. D14—63

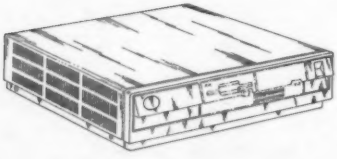




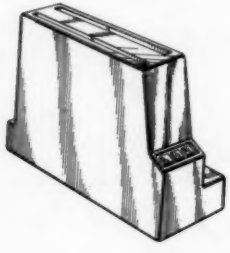
293,443
PERSONAL COMPUTER WITH DISKETTE DRIVE
Myron F. Davis; Willis Y. Jordan, III, both of Boca Raton, Fla.; Walter F. Kraus, La Grangeville, N.Y., and Robert L. Syler, Boca Raton, Fla., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed Sep. 7, 1983, Ser. No. 529,904
Term of patent 14 years
U.S. Cl. D14—100



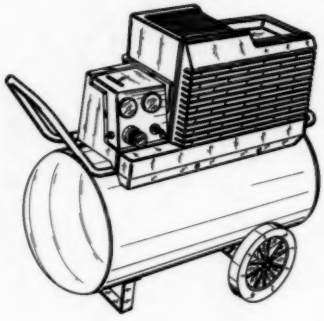
293,444
PERSONAL COMPUTER HOUSING
Vincent S. Garmon, West Palm Beach, Fla., assignor to International Business Machines Corp., Armonk, N.Y.
Filed Feb. 20, 1987, Ser. No. 12,854
Term of patent 14 years
U.S. Cl. D14—100



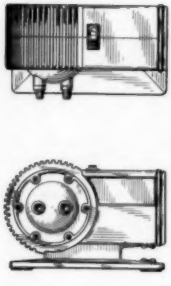
293,445
PRINTER
Frank Pensavecchia, Lake Orion, Mich., assignor to Centronics Data Computer Corp., Hudson, N.H.
Filed Jul. 11, 1985, Ser. No. 754,030
Term of patent 14 years
U.S. Cl. D14—111



293,446
AIR COMPRESSOR
Frederick M. Morgan, Toledo, Ohio, assignor to Champion Spark Plug Company, Toledo, Ohio
Filed Oct. 22, 1986, Ser. No. 922,448
Term of patent 14 years
U.S. Cl. D15—9

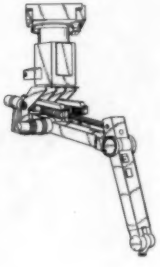


293,447
AIR COMPRESSOR
Dennis V. Hefling, Wichita, Kans., assignor to The Coleman Company, Inc., Wichita, Kans.
Filed Nov. 5, 1986, Ser. No. 927,429
Term of patent 14 years
U.S. Cl. D15—9

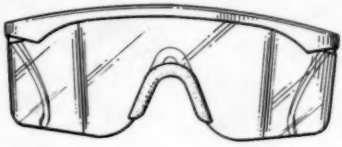


293,448
ICE CREAM MAKER
Susumu Uesaka, Tokyo, Japan, assignor to Nippon Light Metal Company Limited, Japan
Filed May 24, 1984, Ser. No. 613,735
Claims priority, application Japan, Dec. 12, 1983, 58-53326
The portion of the term of this patent subsequent to Oct. 2, 2000, has been disclaimed.
Term of patent 14 years
U.S. Cl. D15—82

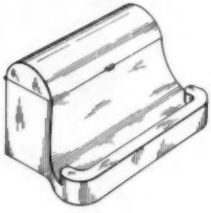
293,449
INDUSTRIAL ROBOT
Herbert Kaufmann, and Torbjörn Forss, both of Västerås, Sweden, assignors to Asea AB, Västerås, Sweden
Filed Mar. 6, 1985, Ser. No. 709,347
Claims priority, application Sweden, Sep. 24, 1984, 84-2532
Term of patent 14 years
U.S. Cl. D15—199



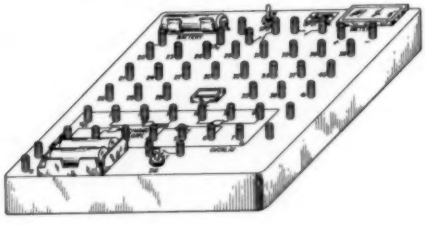
293,450
SUNGLASSES
James H. Jannard, Laguna Niguel, Calif., assignor to Oakley, Inc., Irvine, Calif.
Filed Aug. 15, 1986, Ser. No. 896,736
Term of patent 14 years
U.S. Cl. D16—102



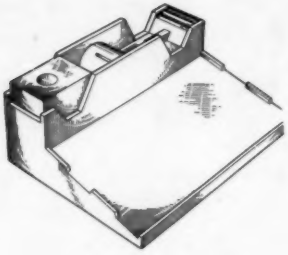
293,451
COMBINED SERVICE EQUIPMENT RECEPTACLE AND HOLDER FOR SPECTACLES
James J. Snell, Beeches, Pitt Lane, Gringley-on-the-Hill, Doncaster, South Yorkshire, and Peter Tillery, 1A Main Street, Ulley, Sheffield, South Yorkshire, both of England
Filed Jul. 17, 1985, Ser. No. 755,926
Term of patent 14 years
U.S. Cl. D16—129



293,452
EDUCATIONAL ELECTRONIC EXPERIMENTATION LAB-KIT
Edwin Z. Gabriel, 91 Mount Tabor Way, Ocean Grove, N.J. 07756
Filed Nov. 13, 1984, Ser. No. 671,089
Term of patent 14 years
U.S. Cl. D17—62

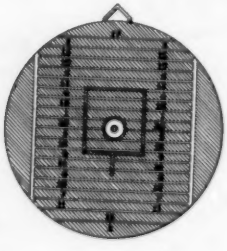


293,453
COMBINED DISPENSER FOR TAPE AND HOLDER FOR NOTE PADS
Lars-Gunnar Johanson, Paris, France, assignor to Watch Out Ltd. AB, Farsta, Sweden
Filed Feb. 20, 1985, Ser. No. 703,348
Term of patent 14 years
U.S. Cl. D19—77

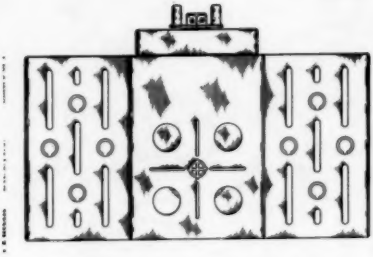


293,454
REGULATOR OF COIN SELECTOR FOR AUTOMATIC VENDOR
Osamu Kobayashi; Masanori Tanaka; Masaki Akagawa, all of Sakado, and Ryoji Yamagishi, Kawagoe, all of Japan, assignors to Kabushiki Kaisha Nippon Coinco, Tokyo, Japan
Filed Sep. 6, 1984, Ser. No. 647,974
Claims priority, application Japan, Mar. 14, 1984, 59-9567
Term of patent 14 years
U.S. Cl. D20—8

293,455
FOOTBALL GAME DART BOARD
Eric Castro; Manuel Castro, both of P.O. Box 193, Banta, Calif. 95304, and Frank T. Silva, 3181 W. Berry Rd., Tracy, Calif. 95376
Filed May 13, 1985, Ser. No. 733,073
Term of patent 14 years
U.S. Cl. D21—6



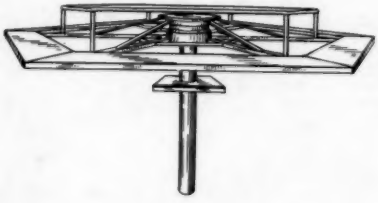
293,456
TOY BENCH WITH VISE
M. Allyson Smith, East Aurora, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.
Filed Nov. 1, 1985, Ser. No. 794,065
Term of patent 14 years
U.S. Cl. D21—121



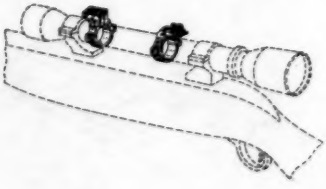
293,457
DOLL
Nancy E. Atkins, 5610 S. Pirates Cove, Tempe, Ariz. 85283
Filed May 20, 1985, Ser. No. 735,661
Term of patent 14 years
U.S. Cl. D21—173

293,458
SPORTS DOLL
Bryan K. Williams, Rte. 4, Box 311, Coushatta, La. 71019
Filed Jun. 26, 1985, Ser. No. 748,762
Term of patent 14 years
U.S. Cl. D21—177

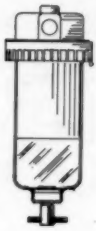
293,459
MERRY-GO-ROUND
Seth H. McCombs, West Grant St., Rushville, Ill. 62681
Filed Jan. 16, 1985, Ser. No. 691,927
Term of patent 14 years
U.S. Cl. D21—249



293,460
SIGHT OVER SCOPE GUN SIGHT
Paul D. Williams, 9241 Davison, Davison, Mich. 48423
Filed May 6, 1985, Ser. No. 731,153
Term of patent 14 years
U.S. Cl. D22—109

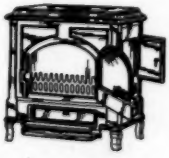


293,461
AIR SEPARATOR FOR AN AIR COMPRESSOR UNIT
Ying-Chung Chang, No. 37, Lane 359, Ta Ya Rd., Tai Chung City, Taiwan
Filed May 14, 1984, Ser. No. 609,824
Term of patent 14 years
U.S. Cl. D23—207

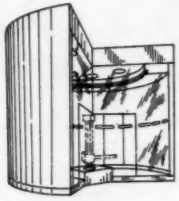


293,462
FUEL DISPENSING NOZZLE
Allen M. Bower, Erie; Eric J. Butterfield, Fairview, both of Pa., and Robert D. Roberts, Jefferson, Ohio, assignors to Emco Wheaton, Inc., Conneaut, Ohio
Filed Oct. 18, 1985, Ser. No. 789,077
Term of patent 14 years
U.S. Cl. D23—226

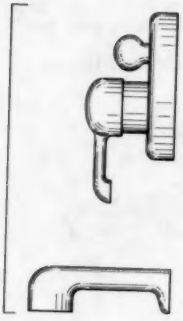
293,463
HEATER
Henri Bastien, Couvin, Belgium, assignor to Fonderies du Lion S.A., Frasnes lez Couvin, Belgium
Filed Dec. 26, 1984, Ser. No. 686,323
Claims priority, application Benelux, Jun. 25, 1984, 59105 01/02/03
Term of patent 14 years
U.S. Cl. D23—346



293,464
FUME HOOD
G. Thomas Saunders, Geneva, Ill., and William E. Baitinger, West Lafayette, Ind., assignors to St. Charles Manufacturing Co., St. Charles, Ill.
Filed Jan. 16, 1986, Ser. No. 819,545
Term of patent 14 years
U.S. Cl. D23—371

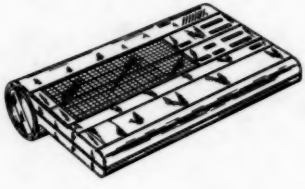


293,465
COMBINED WATER CONTROL VALVE AND SPOUT
Herta A. Bengtsson, Molle, Sweden, assignor to American Standard Inc., New York, N.Y.
Division of Ser. No. 777,477, Sep. 18, 1985. This application Apr. 6, 1987, Ser. No. 35,316
Claims priority, application Fed. Rep. of Germany, Apr. 16, 1985, 20 MR 2048
Term of patent 14 years
U.S. Cl. D23—257

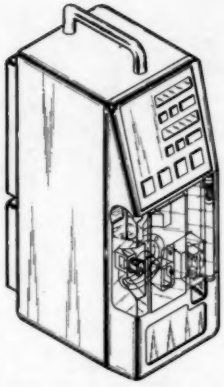


293,466
DENTAL CLEANING JET
Ambrogio Catracchia, 219 - 14th Avenue, Saint-Eustache, Canada (J7P 4B4)
Filed Dec. 3, 1985, Ser. No. 777,285
Term of patent 14 years
U.S. Cl. D24—15

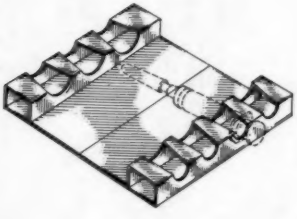
293,467
PHYSIOLOGICAL UNIT FOR MONITORING BODY FUNCTIONS
Marten F. Elkerbout, Drachten, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Apr. 19, 1985, Ser. No. 725,185
Claims priority, application Benelux, Oct. 31, 1984, 59504-00
Term of patent 14 years
U.S. Cl. D24—17



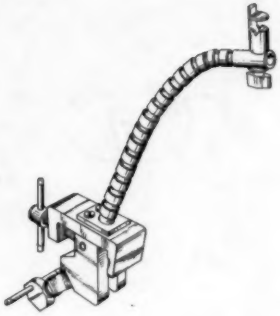
293,468
I.V. INFUSION PUMP
David C. Hill, Poway, and Donald Stanley, San Diego, both of Calif., assignors to Fisher Scientific Group, San Diego, Calif.
Filed Sep. 10, 1985, Ser. No. 774,623
Term of patent 14 years
U.S. Cl. D24—17



293,469
COLLAPSIBLE SYRINGE HOLDER
Gordon M. Greenblatt, 5533 N. 3rd St., Phoenix, Ariz. 85012
Filed Aug. 23, 1985, Ser. No. 768,703
Term of patent 14 years
U.S. Cl. D24—25

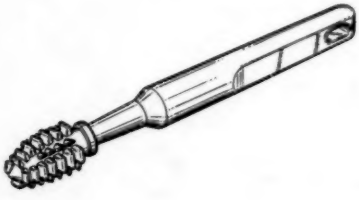


293,470
COMBINED ADJUSTABLE POSITIONER AND HOLDER FOR SURGICAL INSTRUMENTS
David T. Adler, 110 Dumbarton Dr., Huntington, N.Y. 11743
Filed Mar. 14, 1985, Ser. No. 711,618
Term of patent 14 years
U.S. Cl. D24—27



293,471
MASSAGER OR SIMILAR ARTICLE
Atuhiko Sato, 10-20, Matsubara 5-chome, Soka-shi, Saitama, Japan
Filed Apr. 23, 1985, Ser. No. 726,207
Term of patent 14 years
U.S. Cl. D24—36

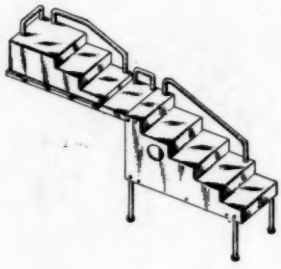
293,472
GUM MASSAGER
Anthony Chrones, Warwick, and Charles C. Richardson, North Kingstown, both of R.I., assignors to Gerber Products Company, Fremont, Mich.
Filed Jul. 3, 1985, Ser. No. 752,217
Term of patent 14 years
U.S. Cl. D24—36



293,473
MALE ERECTION SUSTAINER
John L. Chaney, 156 Broad St., Box 592, Lake Geneva, Wis. 53147
Filed Jan. 14, 1985, Ser. No. 691,078
Term of patent 14 years
U.S. Cl. D24—64

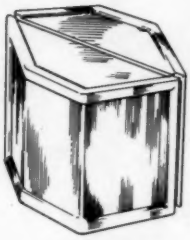
293,474
COMBINED EYE CUP AND EYE DROP DISPENSER CAP
Arthur C. Jermyn, 15914 Overview Rd., Poway, Calif. 92064
Filed Jun. 20, 1985, Ser. No. 746,868
Term of patent 14 years
U.S. Cl. D24—66

293,475
POOL ACCESS APPARATUS FOR THE DISABLED
Lewis J. Daly, 5890 Pierson Rd., Fayetteville, N.Y. 13066
Filed May 28, 1985, Ser. No. 737,948
Term of patent 14 years
U.S. Cl. D25—62

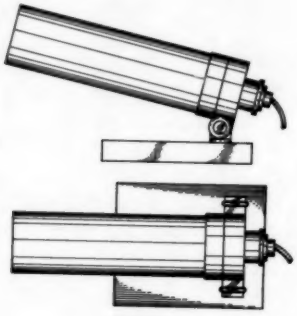


293,476
FIRE ESCAPE POLE
Anthony E. Morales, 5261 Hollywood Blvd., Hollywood, Calif. 90027
Filed Mar. 19, 1985, Ser. No. 713,421
Term of patent 14 years
U.S. Cl. D25—64

293,477
TRANSLUCENT BUILDING BLOCK OR THE LIKE
Thomas J. Pirosko, McMurray, and Francis J. Zavada, Aliquippa, both of Pa., assignors to Pittsburgh Corning Corporation, Pittsburgh, Pa.
Filed Feb. 24, 1984, Ser. No. 583,417
Term of patent 14 years
U.S. Cl. D25—108

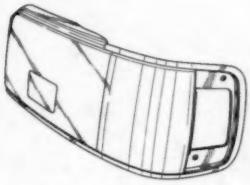


293,478
LAMP FOR EMITTING DECORATIVE LIGHTING EFFECTS
Clint G. Palone, 3001 Jaudon, Kansas City, Mo. 64117
Filed Apr. 22, 1985, Ser. No. 725,779
Term of patent 14 years
U.S. Cl. D26—24



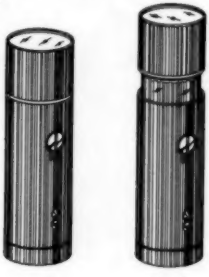
293,479
AUXILIARY VEHICLE BRAKE LIGHT
Roger E. Hughet, West Bloomfield, Mich., assignor to General Motors Corporation, Detroit, Mich.
Filed Jun. 26, 1985, Ser. No. 748,980
Term of patent 14 years
U.S. Cl. D26—28

293,480
COMBINED REAR COMBINATION LAMP AND BEZEL FOR SIDE MARKER LAMP FOR A VEHICLE
Katsuyuki Oki, Toyota, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan
Filed Jul. 31, 1985, Ser. No. 760,969
Term of patent 14 years
U.S. Cl. D26—35

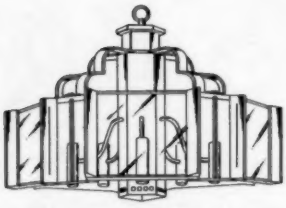


293,481
COMBINED PORTABLE LIGHT AND RADIO
Keiichi Ohashi, Shizuoka, Japan, assignor to Skylite Industry Co., Ltd., Shizuoka, Japan
Filed May 7, 1985, Ser. No. 731,406
Term of patent 14 years
U.S. Cl. D26—38

293,482
FLASHLIGHT
Udo M. Geissler, Munich, Fed. Rep. of Germany, assignor to OSRAM Gesellschaft mit beschränkter Haftung, Munich, Fed. Rep. of Germany
Filed Mar. 11, 1985, Ser. No. 710,142
Claims priority, application Fed. Rep. of Germany, Sep. 13, 1984, MR 14 031
Term of patent 14 years
U.S. Cl. D26—49

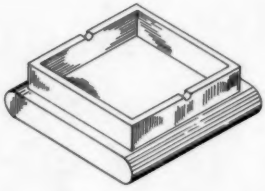


293,483
LIGHT FIXTURE
Fredrick R. Glassman, 9170 La Alba Dr., Whittier, Calif. 90603
Filed Sep. 20, 1985, Ser. No. 778,531
Term of patent 14 years
U.S. Cl. D26—81



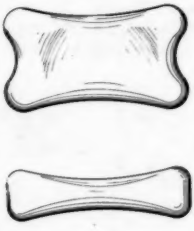
293,484
LIGHTING FIXTURE
Gerhard E. Joerger, Hans-Thoma-Strasse 89-99, 6800 Mannheim 25, Fed. Rep. of Germany
Filed Oct. 16, 1985, Ser. No. 787,888
Claims priority, application Fed. Rep. of Germany, Apr. 26, 1985, MR V/1301
Term of patent 14 years
U.S. Cl. D26—87

293,485
ASH TRAY
Arlan D. Lothe, Sun Prairie, Wis., assignor to Don Evans, Inc., DeForest, Wis.
Filed Aug. 19, 1985, Ser. No. 766,718
Term of patent 14 years
U.S. Cl. D27—29

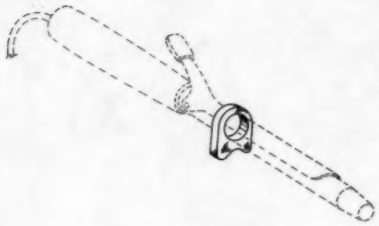


293,486
LIGHTER
Ricardo Aguirre Gili, Barcelona, Spain, assignor to Flamagas, S.A., Barcelona, Spain
Filed Dec. 11, 1985, Ser. No. 807,507
Claims priority, application Spain, Jun. 27, 1985, 108.567
Term of patent 14 years
U.S. Cl. D27—42

293,487
BAR OF SOAP
Walter F. Swanson, 11147 Fogelson Ct., Indianapolis, Ind. 46229
Filed May 10, 1985, Ser. No. 732,647
Term of patent 14 years
U.S. Cl. D28—8.1



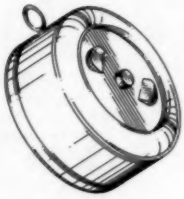
293,488
CURLING IRON RETAINER
Jeffery E. Emmons, 12220 Field Farm Ct., Granger, Ind. 46530
Filed Apr. 5, 1985, Ser. No. 720,395
Term of patent 14 years
U.S. Cl. D28—38



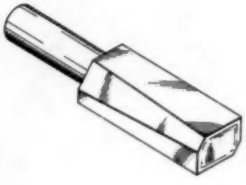
293,489
SPRING LOADED CLIP FOR A HAIR ROLLER OR THE LIKE
Peter L. Franzino, Jacksonville, Fla., assignor to Zip Clip, Inc., Jacksonville, Fla.
Filed Sep. 30, 1985, Ser. No. 782,034
Term of patent 14 years
U.S. Cl. D28—40

293,490
HAIR CLIP
John Cabiddu, 5701 Hansen Rd., Minneapolis, Minn. 55436
Filed Apr. 10, 1985, Ser. No. 721,647
Term of patent 14 years
U.S. Cl. D28—40

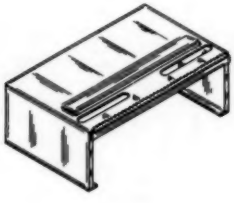
293,491
COMBINATION FLOSS HOLDER AND KEY CHAIN FOB OR SIMILAR ARTICLE
Robert D. Fronske, 1433 E. Wesleyan Dr., Tempe, Ariz. 85282
Filed Aug. 16, 1985, Ser. No. 766,353
Term of patent 14 years
U.S. Cl. D28—64



293,492
PRISMATIC COSMETIC CONTAINER
Walter W. Kemmerer, Peekskill, N.Y., assignor to Guild Molders, Inc., Middletown, N.Y.
Filed Sep. 27, 1985, Ser. No. 781,005
Term of patent 14 years
U.S. Cl. D28—76



293,493
WRAPPING TABLE
Ernest J. Garr, 3587 Powell Dr., Lafayette, Calif. 94549
Filed Feb. 25, 1985, Ser. No. 705,231
Term of patent 14 years
U.S. Cl. D6—449



293,494

COSMETIC CONTAINER WITH MULTIPOSITIONAL CAP

Walter K. Kemmerer, Peekskill, N.Y., assignor to Guild Molders, Inc., Middletown, N.Y.

Filed Sep. 27, 1985, Ser. No. 781,044

Term of patent 14 years

U.S. Cl. D28—82

293,495

PROTECTIVE BODY SUIT

Albert Berryman, and Dwight A. Dorm, both of York, Pa., assignors to Dorinco, Inc., Wilmington, Del.

Filed May 23, 1985, Ser. No. 736,685

Term of patent 14 years

U.S. Cl. D29—10

293,496

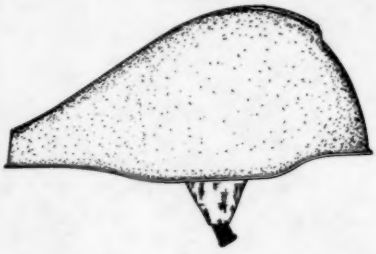
BICYCLE RACING HELMET

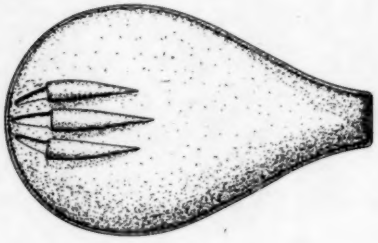
James J. Gentes, 1940-4 Southwest Expressway, San Jose, Calif. 95126

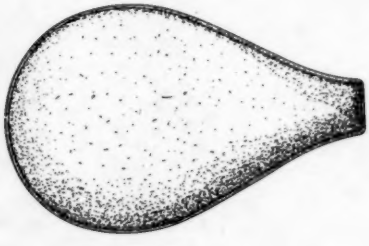
Filed Jun. 14, 1985, Ser. No. 744,810

Term of patent 14 years

U.S. Cl. D29—12







293,497

BUCKLE AND STRAP ASSEMBLY FOR A GIRTH STRAP

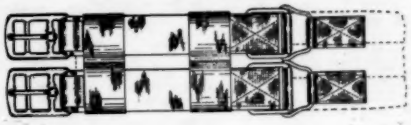
Elizabeth A. Bird, Droitwich, United Kingdom, assignor to Cottage Industries (Equestrian) Limited, Worcestershire, England

Filed Nov. 19, 1984, Ser. No. 672,684

Claims priority, application United Kingdom, May 19, 1984, 1019776

Term of patent 14 years

U.S. Cl. D30—134



293,498

VACUUM CLEANER HOSE HANDLE

William C. Traylor, Jr., Birmingham, Mich., assignor to Whirlpool Corporation, Benton Harbor, Mich.

Filed Oct. 9, 1984, Ser. No. 658,893

Term of patent 14 years

U.S. Cl. D32—31

293,499

SCRAPER

Marc J. Senecal, 1451 Maravilla Ave., and Kevin K. Knapp, 1745 Jefferson Ave., both of, Ft. Myers, Fla. 33901-6860

Filed Nov. 19, 1986, Ser. No. 932,389

Term of patent 14 years

U.S. Cl. D32—49

LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 29TH DAY OF DECEMBER, 1987

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. E. Staley Manufacturing Company: *See*—
Portnoy, Norman A.; and Avery, Larry P., 4,716,186, Cl. 524-50.000.

A.L.E. Systems, Inc.: *See*—
Bees, George L., 4,716,569, Cl. 372-38.000.

A/S Alfred Benzon: *See*—
Kjornaes, Kim; Christensen, Finn N.; and Jensen, Jens R., 4,716,041, Cl. 424-468.000.

A/S Nunc: *See*—
Johansson, Arne; and Namensen, Erland, 4,715,911, Cl. 156-69.000.

AB Holmgrens Armaturfabrik: *See*—
Hesselmar, Karl G., 4,715,755, Cl. 411-39.000.

Abatjoglou, Anthony G.; and Bryant, David R., to Union Carbide Corporation. Hydroformylation using low volatile/organic soluble phosphine ligands. 4,716,250, Cl. 568-454.000.

Abe, Nobutoshi; and Imamura, Kazunori, to Nippon Kogaku K. K. Automatic photomask or reticle washing and cleaning system. 4,715,392, Cl. 134-62.000.

Abel, Heinz: *See*—
Navratil, Josef; and Abel, Heinz, 4,715,863, Cl. 8-440.000.

Abex Corporation: *See*—
Kouns, Herbert H.; and Gardner, Loren D., 4,715,788, Cl. 417-218.000.

Abou-Gharbia, Magid A.; and Nielsen, Susan T., to American Home Products Corporation. Histamine H_1 antagonists. 4,716,165, Cl. 514-265.000.

Abou-Gharbia, Magid A.; Nielsen, Susan T.; and Webb, Michael B., to American Home Products Corporation. Histamine H1 antagonists. 4,716,166, Cl. 514-265.000.

Aboukrat, Simon: *See*—
Sobiepanek, Janusz; and Aboukrat, Simon, 4,716,486, Cl. 361-24.000.

Abramson, Newton L.: *See*—
Reinhold, Donald F.; Utne, Torleif; and Abramson, Newton L., 4,716,246, Cl. 562-446.000.

Acco Babcock Inc.: *See*—
Kottke, Louis E., 4,716,001, Cl. 264-145.000.

Acquaviva, Thomas, to Xerox Corporation. Half-mode copying machine. 4,716,439, Cl. 355-7.000.

Acushnet Company: *See*—
Llort, Francisco M.; Gendreau, Paul M.; and Berard, Raymond A., 4,715,607, Cl. 273-218.000.

Adachi, Hideaki: *See*—
Kawaguchi, Takao; Adachi, Hideaki; Setsune, Kentaro; Ohji, Kenzo; and Wasa, Kiyotaka, 4,715,680, Cl. 350-96.34.

Adachi, Masaaki: *See*—
Tanaka, Hiroyoshi; Adachi, Masaaki; Tsuda, Yoshiyuki; Ando, Toshiaki; Nishiwaki, Humitoshi; and Aoyama, Shigeo, 4,715,437, Cl. 165-151.000.

Adachi, Toshiro: *See*—
Mizuuchi, Kiyoshi; Mizuuchi, Michiyo; and Adachi, Toshiro, 4,716,105, Cl. 435-5.000.

Adam, Colin M.: *See*—
Skinner, David J.; Bye, Richard L., Jr.; Okazaki, Kenji; and Adam, Colin M., 4,715,893, Cl. 75-249.000.

Adams, Carl F. Energy producing apparatus. 4,715,182, Cl. 60-495.000.

Adams, Roman A.: *See*—
Wolff, Donald L.; McCauley, Porter T.; Stiefel, Paul; Takacs, Gyoergy J.; and Adams, Roman A., 4,715,786, Cl. 417-22.000.

Adams, Steven P.: *See*—
Tjoeng, Foe S.; Fok, Kam F.; and Adams, Steven P., 4,716,147, Cl. 514-11.000.

Adolph Coors Company: *See*—
Grims, Conrad M.; and Eldridge, Lawrence B., 4,715,221, Cl. 73-149.000.

Advanced Micro Devices, Inc.: *See*—
Campbell, David L., 4,716,381, Cl. 330-256.000.
Maltiel, Ron; and Yau, Robert L., 4,716,552, Cl. 365-222.000.
Menon, Vinod; and Kaku, Shinkyo, 4,716,467, Cl. 358-260.000.

Advanced Moisture Technology, Inc.: *See*—
Pakulis, Ivars E., 4,716,360, Cl. 324-58.50A.

AE PLC: *See*—
Elderton, John, 4,715,491, Cl. 198-856.000.
Richmond, John W., 4,715,267, Cl. 92-232.000.
Tommis, Norman; and Cooper, James A., 4,715,422, Cl. 164-97.000.

Aerospatiale Societe Nationale Industrielle: *See*—
Poccard, Jacques, 4,715,567, Cl. 244-213.000.

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Savigny, James G., 4,715,167, Cl. 53-572.000.

AGA Aktiebolag: *See*—
Blad, Per A.; and Johansson, Rolf, 4,716,272, Cl. 219-129.000.
Moisala, Tapio; and Gustafsson, Jukka, 4,715,877, Cl. 65-15.000.

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Heylen, Raymond A.; and Boets, Marc J., 4,715,500, Cl. 206-397.000.

Agnoff, Charles. Gravity flow storage system. 4,715,765, Cl. 414-276.000.

Agrawal, Rakesh: *See*—
Auvil, Steven R.; and Agrawal, Rakesh, 4,715,873, Cl. 62-13.000.

Ahearn, John E.; Frates, Raymond A.; Girard, Dennis; Koepke, Richard A.; Schmidt, James K.; and Manon, C. Dodd, to Isotronics, Inc. Duplex glass preforms for hermetic glass-to-metal sealing. 4,716,082, Cl. 428-428.000.

Aica Kogyo Co., Ltd.: *See*—
Kuribayashi, Yukio, 4,716,400, Cl. 340-572.000.

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Shepheard, Thomas E., 4,715,077, Cl. 14-71.500.

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Holzl, Robert A.; and Benander, Robert E., 4,716,064, Cl. 428-73.000.
Iacoviello, John G., 4,716,192, Cl. 524-549.000.
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Aisan Kogyo KK: *See*—
Eitoku, Kenji; and Hayashi, Kenji, 4,715,220, Cl. 73-118.100.

Aisin Seiki Kabushiki Kaisha: *See*—
Hattori, Takemi; and Takeda, Nobuhiko, 4,715,653, Cl. 297-284.000.
Wakamatsu, Fumio, 4,715,651, Cl. 297-219.000.

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Hunger, Hans-Dieter; and Coutelle, Charles, 4,716,103, Cl. 435-5.000.

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Aktieselskabet Bruel & Kajaer: *See*—
Frederiksen, Erling, 4,715,219, Cl. 73-1.0DV.

Akui, Nobuaki; Ueda, Yasuhiro; and Suzuki, Akira, to Olympus Optical Co., Ltd. Endoscope forceps stopcock. 4,715,360, Cl. 128-4.000.

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Albanese, Rocco J. Supplementary liquid dispensing device. 4,715,279, Cl. 101-148.000.

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Aleksa, David M.: *See*—
Sullivan, F. Ryan; and Aleksa, David M., 4,715,989, Cl. 252-512.000.

Alexander, William C., to Solar Refining, Inc. Switched capacitor induction motor drive. 4,716,515, Cl. 363-138.000.

Alexanian, George. Power saving module. 4,716,490, Cl. 361-155.000.

Alguard, Mark: *See*—
Howarth, John; and Alguard, Mark, 4,715,715, Cl. 356-402.000.

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Timar, Tibor; Zsupan, Kalman; Repasi, Janos; Borsos nee Safranek, Iren; Kiss, Istvan; Fodor, Amdras; and Maroy, Peter, 4,716,238, Cl. 549-408.000.

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Allan, Jonathan M.; Burton, Richard J.; and Jurock, Volker, to CD Medical Inc. Apparatus and method for controlling ultrafiltration during hemodialysis. 4,715,959, Cl. 210-637.000.

Allegheny Ludlum Corporation: *See*—
Johns, Robert H.; and Nauman, John D., 4,715,428, Cl. 164-463.000.

Allen-Bradley Company, Inc.: *See*—
Craker, Robert, 4,716,495, Cl. 361-391.000.
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Allen, Charles R.; and Harshman, Jack D., to Daniel Industries, Inc. Self-cleaning and self-lubricating fluid flowmeter. 4,715,234, Cl. 73-861.910.

Allied Corporation: *See—*
Kim, Jung T., 4,716,059, Cl. 427-443.100.
Skinner, David J.; Bye, Richard L., Jr.; Okazaki, Kenji; and Adam, Colin M., 4,715,893, Cl. 75-249.000.
Taig, Alistair G., 4,715,462, Cl. 180-79.100.

Allied-Signal Inc.: *See—*
Raskin, Donald; Kearney, James E.; and Haznedar, Errol A., 4,716,556, Cl. 367-168.000.

Allred, David D.: *See—*
Ovshinsky, Stanford R.; Hudgens, Stephen J.; Allred, David D.; and Demaggio, Gregory, 4,715,890, Cl. 75-0.5AA.
Ovshinsky, Stanford R.; Hudgens, Stephen J.; Allred, David D.; and DeMaggio, Gregory, 4,715,891, Cl. 75-0.5BA.

Alps Electric Co., Ltd.: *See—*
Hori, Fumihasa, 4,715,737, Cl. 400-569.000.
Hori, Fumihisa, 4,715,277, Cl. 101-93.280.
Igarashi, Sadao, 4,716,387, Cl. 333-26.000.
Numata, Hidetaka; and Kawata, Toshihiko, 4,716,359, Cl. 323-349.000.

Alsthom-Atlantique: *See—*
Thuries, Edmond; Masson, Jean-Paul; and Malik, Louis, 4,715,834, Cl. 439-842.000.

Altman, Barry J.: *See—*
Cudahy, Michael J.; De La Huerga, Carlos; Arneson, Harold N.; Divers, R. Thomas; and Altman, Barry J., 4,715,385, Cl. 128-710.000.

Altner, Ulrich; Falb, Wolfgang; Ryschka, Martin; and Wallroth, Carl-Friedrich, to Dragerwerk Aktiengesellschaft. Overflow trap for anesthetics. 4,715,370, Cl. 128-204.130.

Altounian, George N.; and Grenier, Daniel, to Centre de Recherche Industrielle du Quebec. Polyesters polyols prepared from glutaric acid, succinic acid and adipic acid, and polyurethanes prepared therefrom. 4,716,213, Cl. 528-283.000.

Aluminum Company of America: *See—*
Granger, Douglas A., 4,715,901, Cl. 148-2.000.
Ramsey, Everett M.; Gray, Bruce A.; and Evans, Donald C., 4,715,810, Cl. 432-8.000.

Alvi, Nadeem S.: *See—*
Schubert, Peter J.; and Alvi, Nadeem S., 4,716,128, Cl. 437-41.000.

Alyfuku, Kiyoshi, to Canon Kabushiki Kaisha. Battery checking circuit. 4,716,433, Cl. 354-468.000.

ALZA Corporation: *See—*
Eckenhoff, James B.; Theeuwes, Felix; and Deters, Joseph C., 4,716,031, Cl. 424-453.000.

Amacher, Gene L.; Mathes, Gene R.; Paugstat, John F.; and Mergenthaler, Barry M., to NCR Corporation. Method for fast weighing. 4,715,457, Cl. 177-1.000.

Amacher, Gene L.; Mathes, Gene R.; Paugstat, John F.; and Mergenthaler, Barry M., to NCR Corporation. Method for controlling terminal display indication. 4,716,281, Cl. 235-383.000.

Ambos, Rene ; Quagliaro, Gilles; and Fertil, Alain, to Thomson CSF. Surface wave dispersive filter spectrum analyzer. 4,716,362, Cl. 324-77.00B.

Amco Corporation: *See—*
Kulbersh, Irwin, 4,715,741, Cl. 403-389.000.

American Bank Note Company: *See—*
Roule, Richard L.; and Cantor, Joshua C., 4,715,623, Cl. 283-91.000.

American Cyanamid Company: *See—*
Bitha, Panayota; Child, Ralph G.; Hlavka, Joseph J.; and Lin, Yang-I, 4,716,157, Cl. 514-184.000.
Casey, Donald J.; Jarrett, Peter K.; and Rosati, Louis, 4,716,203, Cl. 525-408.000.
Murdock, Keith C.; and Webb, Richard L., 4,715,993, Cl. 260-380.000.

American Home Products Corporation: *See—*
Abou-Gharbia, Magid A.; and Nielsen, Susan T., 4,716,165, Cl. 514-265.000.
Abou-Gharbia, Magid A.; Nielsen, Susan T.; and Webb, Michael B., 4,716,166, Cl. 514-265.000.
Blank, Robert G.; and Miller, Ronald W., 4,716,042, Cl. 424-474.000.
Ryder, Steven W.; Shand, David G.; and Mullane, John F., 4,716,177, Cl. 514-524.000.

American Microsystems, Inc.: *See—*
Bauer, Jerry R., 4,716,586, Cl. 380-3.000.

American Standard Inc.: *See—*
Han, Doyoung; and Renaud, Merle A., 4,715,190, Cl. 62-201.000.
Rood, Jerry A., 4,715,733, Cl. 384-445.000.

American Telephone and Telegraph Company: *See—*
Duguay, Michel A.; Koch, Thomas L.; Kokubun, Yasuo; and Pfeiffer, Loren N., 4,715,672, Cl. 350-96.120.

American Telephone and Telegraph Company, AT&T Bell Laboratories: *See—*
Angell, Eric H.; Aprille, Thomas J.; Azaret, Juan O.; Fang, Rong-Chin; Lee, Byeong G.; Longwell, Brian C.; Sharper, Craig A.; and Spalink, Jan-Dieter, 4,716,561, Cl. 370-55.000.
Green, Martin L.; Levy, Roland A.; and Nuzzo, Ralph G., 4,716,050, Cl. 427-99.000.
Johnston, Wilbur D., Jr.; and Long, Judith A., 4,716,130, Cl. 437-104.000.
Miller, David A. B., 4,716,449, Cl. 357-30.000.

Amersham International plc: *See—*
Chiswell, David J., 4,716,106, Cl. 435-6.000.
Colin, David, 4,715,988, Cl. 252-408.100.

Ames, Alan J., to United States of America, Army. Optical collimator target illumination. 4,716,507, Cl. 362-311.000.

Amino, Hiroyuki, to Amino Iron Works Co., Ltd. 180 degree inverting machine. 4,715,775, Cl. 414-758.000.

Amino Iron Works Co., Ltd.: *See—*
Amino, Hiroyuki, 4,715,775, Cl. 414-758.000.

Amoco Corporation: *See—*
Clendinning, Robert A.; and Maresca, Louis M., 4,716,211, Cl. 528-126.000.
Lambousy, George G.; Reaves, Benjamin H.; and Nelson, William E., 4,715,996, Cl. 261-114.200.

AMP Incorporated: *See—*
Andrews, Howard W., Jr.; Pickles, Charles S.; and Taylor, Attalee S., 4,715,820, Cl. 439-59.000.
Bright, Edward J.; and Sinisi, David B., 4,716,494, Cl. 361-386.000.
Furman, Lev B., 4,715,827, Cl. 439-465.000.
Jackson, Mark F.; Lawruk, Stephen P.; Schlegel, Dallas E.; and Spong, Richard V., 4,715,112, Cl. 29-739.000.
Kevern, James D.; Stape, William J.; and Weber, Robert N., 4,715,675, Cl. 350-96.200.
Preputnick, George, 4,715,829, Cl. 439-660.000.

Ampex Corporation: *See—*
Fair, Kenneth E.; and Campbell, Charles M., 4,715,558, Cl. 242-199.000.
Oldershaw, Reginald W.; and Wagner, Steven D., 4,716,454, Cl. 358-18.000.

Amphenol Corporation: *See—*
Margolin, Mark; Grois, Igor; and Moore, James E., 4,715,251, Cl. 81-9.400.

AMSTED Industries Incorporated: *See—*
Hood, Charles N., II, 4,715,290, Cl. 105-199.300.

Amstutz, Harlan C.; and Kabo, J. Michael, to University of California, The Regents of the. Porous acetabular hip resurfacing. 4,715,860, Cl. 623-22.000.

Andersen, Jon A.: *See—*
Alaimo, Robert J.; and Andersen, Jon A., 4,716,168, Cl. 514-293.000.

Andersen, Marinus L., to Hach Company. Pump colorimetric analyzer. 4,715,710, Cl. 356-246.000.

Andersen, Robert N.; and Walker, Harrell L., to United States of America, Agriculture. Control of eastern black nightshade with a fungal pathogen. 4,715,881, Cl. 71-79.000.

Anderson, David K.: *See—*
Bianca, Joseph D.; and Anderson, David K., 4,715,301, Cl. 110-347.000.

Anderson, James. Rotary lawn mower accessories. 4,715,173, Cl. 56-295.000.

Anderson, Milan B., deceased (by Anderson, Thelma, administratrix), to Hewitt Tubular Products, Inc. Tandem wheel chock. 4,715,480, Cl. 188-74.000.

Anderson, Patricia P.: *See—*
Takekoshi, Tohru; and Anderson, Patricia P., 4,716,216, Cl. 528-352.000.

Anderson, Roy W.; Rosa, Stephen J.; and Henderson, Larry D., to United Technologies Corporation. Arrangement for controllably mixing volatile materials. 4,715,723, Cl. 366-142.000.

Anderson, Thelma, administratrix: *See—*
Anderson, Milan B., deceased, 4,715,480, Cl. 188-74.000.

Ando, Fumitaka: *See—*
Kijima, Takao; and Ando, Fumitaka, 4,715,614, Cl. 280-701.000.
Kijima, Takao; and Ando, Fumitaka, 4,715,615, Cl. 280-701.000.

Ando, Hideo, to Kabushiki Kaisha Toshiba. Optical head for focusing a light beam on an optical disk. 4,716,283, Cl. 250-201.000.

Ando, Seigo: *See—*
Hosoe, Toshiaki; Ando, Seigo; and Kawase, Yoshihiro, 4,716,366, Cl. 324-207.000.

Ando, Toshiaki: *See—*
Tanaka, Hiroyoshi; Adachi, Masaaki; Tsuda, Yoshiyuki; Ando, Toshiaki; Nishiwaki, Humitoshi; and Aoyama, Shigeo, 4,715,437, Cl. 165-151.000.

Andrews, Howard W., Jr.; Pickles, Charles S.; and Taylor, Attalee S., to AMP Incorporated. Connection system for printed circuit boards. 4,715,820, Cl. 439-59.000.

Andrich, Wolfgang; and Schilling Helmut W., to Alcatel NV. Apparatus for scanning documents in a raster line mode using margin stops. 4,716,300, Cl. 250-578.000.

Angell, Eric H.; Aprille, Thomas J.; Azaret, Juan O.; Fang, Rong-Chin; Lee, Byeong G.; Longwell, Brian C.; Sharper, Craig A.; and Spalink, Jan-Dieter, to American Telephone and Telegraph Company, AT&T Bell Laboratories. Digital transmission including add/drop module. 4,716,561, Cl. 370-55.000.

Ansel, Robert E.: *See—*
Schmid, Steven R.; Ansel, Robert E.; and Murray, Kevin P., 4,716,209, Cl. 526-261.000.

ANT Nachrichtentechnik GmbH: *See—*
Scheuermann, Helmut, 4,716,537, Cl. 364-724.000.

Anton, Christian: *See—*
Arnoux, Daniel; Genter, Claude; Anton, Christian; and Forme, Jacques, 4,716,412, Cl. 340-753.000.

Anzai, Hisatugu: *See—*
Atsumi, Haruyuki; Anzai, Hisatugu; and Kasahara, Noboru, 4,715,146, Cl. 49-1.000.

Aoki, Satoshi: *See*—
Mori, Shosuke; Sakurai, Atsushi; Aoki, Satoshi; and Suzuki, Tatsuya, 4,716,526, Cl. 364-200.000.

Aonuma, Masashi: *See*—
Okita, Tsutomu; Hashimoto, Hiroshi; and Aonuma, Masashi, 4,716,077, Cl. 428-328.000.

Aoyama, Keizo, to Fujitsu Limited. Regulated power supply for semiconductor chips with compensation for changes in electrical characteristics or chips and in external power supply. 4,716,307, Cl. 307-297.000.

Aoyama, Shigeo: *See*—
Tanaka, Hiroyoshi; Adachi, Masaaki; Tsuda, Yoshiyuki; Ando, Toshiaki; Nishiwaki, Humitoshi; and Aoyama, Shigeo, 4,715,437, Cl. 165-151.000.

Apex Technologies, Inc.: *See*—
Muller, Gary R.; Theiss, Scott M.; Brown, James E., Jr.; and Lawson, Bobby R., 4,715,324, Cl. 122-381.000.

Apollo Computer, Inc.: *See*—
Douros, Bryan P.; and Marcuvitz, Andrew, 4,715,575, Cl. 375-3.000.

Aprille, Thomas J.: *See*—
Angell, Eric H.; Aprille, Thomas J.; Azaret, Juan O.; Fang, Rong-Chin; Lee, Byeong G.; Longwell, Brian C.; Sharper, Craig A.; and Spalink, Jan-Dieter, 4,716,561, Cl. 370-55.000.

Arai, Shinichi: *See*—
Sato, Naoki; Kamo, Yoshihisa; Katoh, Yasuhiro; Kosuge, Minoru; and Arai, Shinichi, 4,716,306, Cl. 307-296.00R.

Arai, Takao: *See*—
Ito, Masahiro; Kobayashi, Masaharu; and Arai, Takao, 4,716,567, Cl. 371-40.000.

Arai, Takashi, to Canon Kabushiki Kaisha. Injection molding machine. 4,715,802, Cl. 425-130.000.

Arakawa, Kazuhiko: *See*—
Tokura, Go; Arakawa, Kazuhiko; and Terashima, Jun, 4,716,259, Cl. 174-68.500.

Arakawa, Toshihiko: *See*—
Kasai, Kiyoshi; Tsukidate, Takaaki; and Arakawa, Toshihiko, 4,716,028, Cl. 423-344.000.

Aranovich, Felix, to Clevite Industries Inc. Spool valve assembly. 4,715,407, Cl. 137-625.650.

Araseki, Takashi: *See*—
Ozawa, Kazunori; and Araseki, Takashi, 4,716,592, Cl. 381-40.000.

Arfsten, Nanning J.: *See*—
Dislich, Helmut; Arfsten, Nanning J.; Schmidt, Helmut; Philipp, Gottfried; and Tuenker, Gerhard, 4,715,999, Cl. 264-1.100.

Arima, Hideo: *See*—
Noro, Takanobu; Koakutsu, Yasumasa; Takeuchi, Tamio; Yano, Masao; Onoda, Seiichi; Arima, Hideo; Yokono, Hitoshi; and Tanei, Hirayoshi, 4,715,673, Cl. 350-96.200.

Arima, Takemi: *See*—
Morishita, Akira; Okamoto, Kyoithi; Gotoh, Toshihiko; Kako, Yukio; and Arima, Takemi, 4,715,243, Cl. 74-434.000.

Armco Inc.: *See*—
Christ, Christy; Campbell, Herbert F.; Fields, Gayle P.; and Burris, James L., 4,716,075, Cl. 428-285.000.
Holming, Robert; Nelson, Robert S.; and Daley, Thomas R., 4,715,546, Cl. 241-171.000.

Arneson, Harold N.: *See*—
Cudahy, Michael J.; De La Huerga, Carlos; Arneson, Harold N.; Divers, R. Thomas; and Altman, Barry J., 4,715,385, Cl. 128-710.000.

Arnold, Allen J.; Courtney, Mark G.; Kirby, Diane N.; Mis, Katherine H.; and Sutton, Kerry L., to International Business Machines Corporation. Environmentally secure and thermally efficient heat sink assembly. 4,715,430, Cl. 165-80.300.

Arnoux, Daniel; Genter, Claude; Anton, Christian; and Forme, Jacques, to Bleris. Plane-structure quantified analog display unit and analog measuring device comprising such a display unit. 4,716,412, Cl. 340-753.000.

Aro Corporation, The: *See*—
Perhach, John M.; Porter, Charles E., Jr.; and Maloney, David C., 4,715,215, Cl. 73-49.300.

Aronstam, Peter S.: *See*—
Yasuda, Arthur K.; Kennedy, William S.; and Aronstam, Peter S., 4,715,469, Cl. 181-102.000.

Arroyo, Juan. Surgical instrumentation including a clamp assembly to facilitate attachment of blood vessel sections. 4,715,377, Cl. 128-335.000.

Arsura, Emilio: *See*—
Capizzi, Amedeo; Spinelli, Pia; and Arsura, Emilio, 4,715,536, Cl. 239-54.000.

Asahi Dempa Co., Ltd.: *See*—
Hayashi, Hitoaki, 4,716,332, Cl. 310-368.000.

Asahi Kasei Kogyo Kabushiki Kaisha: *See*—
Fukui, Minoru; and Kataoka, Naoki, 4,715,235, Cl. 73-862.680.
Minonishi, Kuniaki; and Sato, Reijiro, 4,716,094, Cl. 430-284.000.

Asahi Kogaku Kogyo Kabushiki Kaisha: *See*—
Doi, Yuzuru, 4,716,288, Cl. 250-227.000.
Morimoto, Akira, 4,715,699, Cl. 350-6.800.
Shindo, Osamu, 4,716,431, Cl. 354-407.000.

Asakura, Masahiko: *See*—
Kawanabe, Tomohiko; Kushida, Noritaka; Asakura, Masahiko; and Seki, Yasunari, 4,715,350, Cl. 123-587.000.
Kawanabe, Tomohiko; Asakura, Masahiko; Kushida, Noritaka; and Kimura, Katsuhiko, 4,715,352, Cl. 123-589.000.

Asami, Ken; Ohashi, Kaoru; Onuma, Toshio; and Buma, Shuuichi, to Toyota Jidosha Kabushiki Kaisha. Rear suspension controller. 4,715,616, Cl. 280-707.000.

ASC Incorporated: *See*—
Bores, Leonard F.; and Zdziarski, Mark J., 4,715,649, Cl. 296-218.000.

Asgalium S.A.: *See*—
Heyraud, Marc, 4,716,330, Cl. 310-233.000.

Ashby, Robert E.: *See*—
Leese, David J.; and Ashby, Robert E., 4,715,530, Cl. 229-73.000.

Asta-Werke Aktiengesellschaft Chemische Fabrik: *See*—
Engel, Jurgen; Kleemann, Axel; Niemeyer, Ulf; Hilgard, Peter; and Pohl, Joerg, 4,716,242, Cl. 558-81.000.

Astec Industries, Inc.: *See*—
Brock, J. Donald, 4,715,720, Cl. 366-25.000.

Asten, Wolfgang V.; Dorner, Karl H.; Scheel, Hartmut; and Wurstle, Volker, to Vereinigte Aluminium-Werke Aktiengesellschaft. Aluminum offset coil, and method for its production. 4,715,903, Cl. 148-11.50A.

Astley, Graham J.: *See*—
Wentworth, Robert J.; and Astley, Graham J., 4,715,287, Cl. 104-172.300.

AT&T Bell Laboratories: *See*—
Pawelski, Robert L., 4,716,453, Cl. 358-13.000.

AT&T Information Systems Inc.: *See*—
Daudelin, Douglas S., 4,716,376, Cl. 329-107.000.

Atlantic Richfield Company: *See*—
Bseisu, Amjad A.; Jan, Yih-Min; and Schuh, Frank J., 4,715,451, Cl. 175-40.000.
MacAllister, Donald J.; and Pennington, Virginia W., 4,715,444, Cl. 166-269.000.

Atsumi, Haruyuki; Anzai, Hisatugu; and Kasahara, Noboru, to Ryobi Limited; and Hochiki Corporation. Apparatus for closing fireproof doors. 4,715,146, Cl. 49-1.000.

Austel, Volkhard: *See*—
Heider, Joachim; Hauel, Norbert; Austel, Volkhard; Noll, Klaus; Bomhard, Andreas; van Meel, Jacques; and Diederen, Willi, 4,716,169, Cl. 514-299.000.

Automatic Packaging Systems, Inc.: *See*—
Lerner, Bernard; Liebhart, Dana; and Wehrmann, Rick S., 4,715,092, Cl. 17-52.000.

Automeg, Inc.: *See*—
Horvath, Joseph G.; and Miller, James C., 4,716,487, Cl. 361-42.000.

Autotrol Corporation: *See*—
Roos, William N., 4,716,325, Cl. 310-41.000.

Auvil, Steven R.; and Agrawal, Rakesh, to Air Products and Chemicals, Inc. Liquefied gases using an air recycle liquefier. 4,715,872, Cl. 62-13.000.

Avar, Lajos, to Sandoz Ltd. Stabilizing polymers. 4,716,187, Cl. 524-99.000.

Avery, Larry P.: *See*—
Portnoy, Norman A.; and Avery, Larry P., 4,716,186, Cl. 524-50.000.

AVL AG: *See*—
Wolfbeis, Otto S.; and Offenbacher, Helmut, 4,716,118, Cl. 436-2.000.

AVT Anlagen- und Verfahrenstechnik GmbH: *See*—
Krambrock, Wolfgang, 4,715,748, Cl. 406-11.000.

Axell, Claes E. S., to Telefonaktiebolaget L M Ericsson. Coaxial plug for use in a junction between a coaxial conductor and a stripline. 4,715,821, Cl. 439-59.000.

Azaret, Juan O.: *See*—
Angell, Eric H.; Aprille, Thomas J.; Azaret, Juan O.; Fang, Rong-Chin; Lee, Byeong G.; Longwell, Brian C.; Sharper, Craig A.; and Spalink, Jan-Dieter, 4,716,561, Cl. 370-55.000.

B.C.S. S.p.A.: *See*—
Bernardi, Guido, 4,715,238, Cl. 74-6.000.

B.F. Goodrich Company, The: *See*—
Sullivan, F. Ryan; and Aleksa, David M., 4,715,989, Cl. 252-512.000.

Baasner, Bernd: *See*—
Klauke, Erich; Baasner, Bernd; and Schundehutte, Karl H., 4,716,229, Cl. 544-334.000.

Baba, Takaaki: *See*—
Kobayashi, Kiyotaka; Tsukasaki, Hidaka; and Baba, Takaaki, 4,715,348, Cl. 123-571.000.

Bach, Erik, to Interlego A.G. Current-carrying element. 4,715,832, Cl. 439-723.000.

Backlund, Ulf E. H. H.; and Ungerstedt, Carl U. Apparatus for manipulating small volumes of liquid. 4,715,413, Cl. 141-94.000.

Baier, Paul W.; and Rausch, Peter, to Siemens Aktiengesellschaft. Wirelessly functioning signal transmission system. 4,716,574, Cl. 375-1.000.

Baillie, William R.; Macias, Jorge; and Dressendorfer, Michael, to Russ Bassett Company. Cartridge cabinet drawer. 4,715,669, Cl. 312-12.000.

Baines, John H.: *See*—
Brine, Satya S.; Baines, John H.; and Poulin, Suzanne C. M., 4,715,628, Cl. 292-19.000.

Baker, Terence S.; Powell, Michael J.; and Titmas, Richard C., to Boots-Celltech Diagnostics Limited. Immunoassay. 4,716,109, Cl. 435-7.000.

Ball, Donald L.; and Boateng, Daniel A. D., to Cominco Ltd. Method for removal of monovalent ions from $ZnSO_4$ electrolyte by electrodialysis. 4,715,939, Cl. 204-182.400.

Ballard, James G.: *See*—
Liegel, Reinald D.; and Ballard, James G., 4,715,789, Cl. 417-253.000.

Ballon-Mueller AG: *See*—
Nelson, David C.; Fresh, Michael J.; and Mueller, Herbert, 4,715,841, Cl. 446-222.000.

Baloga, Mark A., to Steelcase Inc. Space partition module. 4,715,154, Cl. 52-239.000.

Barbier, Jean-Paul: *See*—
Pean, Jean-Louis; Desvard, Catherine; and Brrbier, Jean-Paul, 4,715,985, Cl. 252-305.000.

Bardsley, Frank B.: *See*—
Boxell, Timothy G.; Bardsley, Frank B.; and Stoddart, David E., 4,715,440, Cl. 166-100.000.

Barkley, Vincent P., to Pace Incorporated. Locator. 4,715,640, Cl. 294-106.000.

Barnett, Daniel J.: *See*—
Schellhamer, Alan J.; Barnett, Daniel J.; and Khan, Abdul Q., 4,715,931, Cl. 162-199.000.

Barnhart, William D. Sanitary device for animals. 4,715,320, Cl. 119-1.000.

Baronoff, Jay H.: *See*—
Ford, Allan L.; and Baronoff, Jay H., 4,715,839, Cl. 446-28.000.

Bartholmae, Jack N.: *See*—
Tompkins, E. Neil; and Bartholmae, Jack N., 4,716,585, Cl. 379-202.000.

Bartley, David H.: *See*—
Oxley, Donald W.; Bartley, David H.; and McEntee, Timothy J., 4,716,524, Cl. 364-200.000.

Bartley, George S., to Minolta Camera Kabushiki Kaisha. Variable dimension and variable orientation graphics bit-map computer memory. 4,716,544, Cl. 364-900.000.

Barton, James T.: *See*—
Koek, Kevin C.; Matthias, William T.; and Barton, James T., 4,715,682, Cl. 350-253.000.

Barud, Sigvard, to Siemens Aktiengesellschaft. X-ray examination apparatus. 4,716,581, Cl. 378-198.000.

BASF Aktiengesellschaft: *See*—
Ernst, Hansgeorg; Littmann, Wolfgang; and Paust, Joachim, 4,716,243, Cl. 558-395.000.
Hagen, Helmut; Kohler, Rolf-Dieter; Markert, Jurgen; and Wuerzer, Bruno, 4,715,889, Cl. 71-94.000.
Stanek, Richard; Marx, Hans-Norbert; Hettler, Wendelin; and Wagner, Claus, 4,716,054, Cl. 427-297.000.

BASF Corporation: *See*—
Sanders, John H.; Hoblit, Louis D.; and Mann, Joe A., 4,716,055, Cl. 427-304.000.

Baskett, Ira E.; and Sluss, Gene T., to Motorola, Inc. Current switch for programming vertical fuses of a read only memory. 4,716,547, Cl. 365-96.000.

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Place, John; and Bregnard, Andre , 4,715,943, Cl. 204-299.00R.

Baucom, D. Michael; and Gomez, Sergio V. Microprocessor based level and angle finder. 4,716,534, Cl. 364-559.000.

Bauer, Jerry R., to American Microsystems, Inc. State sequence dependent read only memory. 4,716,586, Cl. 380-3.000.

Bauer, Manfred: *See*—
Habrich, Reiner; Bauer, Manfred; and Reiter, Alois, 4,715,795, Cl. 417-568.000.

Baumann, Dieter: *See*—
Rabener, Claus W.; Horner, Hans-Peter; and Baumann, Dieter, 4,716,185, Cl. 523-456.000.

Baumann, Karl-Heinz; Schick, Gerald; Kassing, Lothar; Bossenmaier, Alban; and Brambilla, Luigi, to Daimler-Benz Aktiengesellschaft. Device for controlling a roll bar serving as a safety device for the occupants of a motor vehicle. 4,715,468, Cl. 180-271.000.

Baxter Travenol Laboratories, Inc.: *See*—
Leonard, Ronald J., 4,715,953, Cl. 210-321.800.
Thorogood, Douglas E., 4,715,165, Cl. 53-469.000.

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Fest, Christa; Brandes, Wilhelm; Hanssler, Gerd; and Reinecke, Paul, 4,716,176, Cl. 514-477.000.
Hess, Heinrich; Grogler, Gerhard; and Kopp, Richard, 4,716,182, Cl. 521-163.000.
Klauke, Erich; Baasner, Bernd; and Schundehutte, Karl H., 4,716,229, Cl. 544-334.000.
Kramer, Wolfgang; Buchel, Karl H.; Frohberger, Paul-Ernst; Brandes, Wilhelm; and Lurssen, Klaus, 4,715,887, Cl. 71-92.000.
Kruger, Bernd-Wieland; Lockhoff, Oswald; Metzger, Karl G.; Opitz, Hans-Georg; Schaller, Klaus; Stunkel, Klaus G.; and Zeiler, Hans-Joachim, 4,716,152, Cl. 514-25.000.
Mann, Max; and Kapps, Manfred, 4,715,746, Cl. 405-264.000.
Marzolph, Gerhard; Lunkenheimer, Winfried; and Fedtke, Carl, 4,715,888, Cl. 71-93.000.
Trummelmeyer, Gerhard; and Ruprecht, Hans-Dieter, 4,716,210, Cl. 528-75.000.
Wagner, Rudolf; Halcour, Kurt; Dicke, Hans-Rudolf; and Eckhardt, Volker, 4,716,252, Cl. 568-729.000.

BBC Brown, Boveri & Company, Ltd.: *See*—
Guttinger, Heinrich, 4,715,797, Cl. 418-55.000.

Beam, Dennis A.: *See*—
Sarazen, Paul M., Jr.; and Beam, Dennis A., 4,715,532, Cl. 236-49.000.

Beard, Charles D.: *See*—
Dunks, Gary B.; Yamada, Akira; Beard, Charles D.; and Doddi, Namassivaya, 4,716,234, Cl. 548-259.000.

Beauregard, Robert, to Fortin, Roch, part interest to each; and Nizet, Pierre, part interest to each. Goal-keeper pad. 4,715,067, Cl. 2-22.000.

Beausoleil, William F.; and McManigal, David F., to International Business Machines Corporation. Memory organization for vertical and horizontal vectors in a raster scan display system. 4,716,546, Cl. 364-900.000.

Beaver, Richard P., to PPG Industries, Inc. Method of preparation of packed fiber glass reaction vessel. 4,715,105, Cl. 29-419.00G.

Beckmann, Rudolf: *See*—
Muller, Eckart; and Beckmann, Rudolf, 4,715,179, Cl. 60-274.000.

Beecham Group p.l.c.: *See*—
Markwell, Roger E.; Ward, Robert W.; and de Mello, Carol R., 4,716,160, Cl. 514-212.000.

Bees, George L., to A.L.E. Systems, Inc. Power supply for negative impedance gas discharge lasers. 4,716,569, Cl. 372-38.000.

Behrens, Robert N. Air motivated conduit prover apparatus. 4,715,747, Cl. 405-303.000.

Beigler, Myron A.: *See*—
Tsay, Yuh-Geng; Beigler, Myron A.; Calenoff, Emanuel; Friesen, Gerald L.; and Nichols, James L., 4,716,120, Cl. 436-513.000.

Belanger, Inc.: *See*—
Belanger, James A., 4,715,101, Cl. 29-149.50C.
Wentworth, Robert J.; and Astley, Graham J., 4,715,287, Cl. 104-172.300.

Belanger, James A., to Belanger, Inc. Method of making a plastic bearing. 4,715,101, Cl. 29-149.50C.

Bell, Donald: *See*—
O'Connor, Stuart; Bell, Donald; Fox, Trevor R.; and Townsend, Paul, 4,716,408, Cl. 340-825.500.

Bell, Isaac M., to RCA Corporation. Temperature compensation apparatus for an electrical circuit. 4,716,315, Cl. 307-491.000.

Bell, Ronald F.: *See*—
Potter, Charles; Bell, Ronald F.; and Tosill, John M., 4,715,517, Cl. 222-181.000.

Bellis, Harold E.; and McBride, Edward F., to Du Pont de Nemours, E. I., and Company. Composition and method for temporarily reducing permeability of subterranean formations. 4,715,967, Cl. 252-8.551.

Bemis Company, Inc.: *See*—
Perazzo, Nicholas J., 4,715,412, Cl. 141-1.000.

Benander, Robert E.: *See*—
Holzl, Robert A.; and Benander, Robert E., 4,716,064, Cl. 428-73.000.

Benchmark Ventures: *See*—
Brink, Douglas F.; and MacConnell, John, 4,715,633, Cl. 294-31.200.

Bencloski, William A.: *See*—
Gallo, Frank G.; Swenson, Clark E.; Bencloski, William A.; Cassette, Angelo J.; Manno, John L.; and Parlak, Edward A., 4,716,010, Cl. 376-260.000.

Benesh, Alvin H. Wind turbine system using a savonius type rotor. 4,715,776, Cl. 415-2.00R.

Bennett, Clifford: *See*—
Reichman, Benjamin; Venkatesan, Srini; Fetcenko, Michael A.; Jeffries, Kenneth; Stahl, Sharon; and Bennett, Clifford, 4,716,088, Cl. 429-101.000.

Benoit, Philippe; Chielens, Alain; and Voisin, Jean-Paul, to Fives-Cail Babcock. Clinker manufacture control using falling clinker colorific energy measurement. 4,716,532, Cl. 364-477.000.

Benson, David J.; Brown, Carl H.; and Hancock, William R., to Sperry Corporation. Display refresh memory apparatus utilizing one half frame updating. 4,716,460, Cl. 358-140.000.

Berard, Raymond A.: *See*—
Llort, Francisco M.; Gendreau, Paul M.; and Berard, Raymond A., 4,715,607, Cl. 273-218.000.

Berg, Lloyd; and Vosburgh, Mark G. Separation of n-propanol from 2-butanol by extractive distillation. 4,715,933, Cl. 203-51.000.

Berger, Franz: *See*—
Geisser, Peter; Kaiser, Hans P.; and Berger, Franz, 4,715,851, Cl. 604-82.000.

Berger, Jean L., to Thomson-CSF. Charge transfer analog comparator and devices using such a comparator. 4,716,580, Cl. 377-62.000.

Berghoff, Wellington F., to Glidden Company, The. Acrylic polyester high solids coatings. 4,716,200, Cl. 525-111.000.

Bergstrom, Bo C.; and Herolf, Knut O. M., to Telefonaktiebolaget LM Ericsson. Method of reducing the effect of narrowband jammers in radio communication between two stations. 4,716,573, Cl. 375-1.000.

Bergwerksverband GmbH: *See*—
Mann, Max; and Kapps, Manfred, 4,715,746, Cl. 405-264.000.

Berlin, Bo; and Nedstedt, Gert, to Tetra Pak International AB. Metering pump. 4,715,791, Cl. 417-274.000.

Berman, Cary; and Kiss, Steven. Fully collapsible portable chair. 4,715,650, Cl. 297-28.000.

Bernabeu, Eugenio P. Ruler for measuring angles between an oriented axis and a vector. 4,715,127, Cl. 33-494.000.

Bernard, Gilles; and Delalande, Francois, to Compagnie Europeene de Composants Electroniques. Connecting strip for the manufacture of direct transfer electric components and manufacturing method for such components. 4,715,118, Cl. 29-856.000.

Bernardi, Guido, to B.C.S. S.p.A. Starter device for internal combustion engines. 4,715,238, Cl. 74-6.000.

Bernstrom, Marvin L., to Eaton Corporation. Two-speed valve-in star motor. 4,715,798, Cl. 418-57.000.

Beroza, Gregory A. Gastro-intestinal lavage system and method. 4,715,848, Cl. 604-35.000.

Berry, Joe R.; Langowski, Faustyn C.; Renfro, James G.; and Smith, Roger, Jr., to Hughes Tool Company. Universal floor mounted pipe handling machine. 4,715,761, Cl. 414-22.000.

Berry, William A., to Standard Slag Cement. Cementitious binder for consolidated fill. 4,715,896, Cl. 106-117.000.

Berryman, Leslie N.: *See*—
Walker, Lonnie R.; Berryman, Leslie N.; Guffee, Larry E.; Ripley, David E.; and Prucha, David A., 4,715,721, Cl. 366-132.000.

Besemann, Alfred, to E. C. H. Will (GmbH & Co.). Self-locking device for transmitting torque to bobbin cores. 4,715,551, Cl. 242-46.400.

Bessko, Csaba: *See*—
Kapoor, Anoop; Choby, Edward J.; Kramer, Thomas J.; Ranieri, James E.; Roth, Charles H., Jr.; Scheffer, Donald E.; Spehar, John E., Jr.; Bessko, Csaba; and Blumstein, Robert M., 4,715,111, Cl. 29-723.000.

Best, Donald D., Jr., to Hornbeck, David A., a part interest. Expansible piton. 4,715,568, Cl. 248-1.000.

Bethel, George F.: *See*—
Erich, Richard R., 4,715,240, Cl. 74-52.000.

Bethel, Patience K.: *See*—
Erich, Richard R., 4,715,240, Cl. 74-52.000.

Bethlehem Steel Corporation: *See*—
Schmidt, Manfred; and Fenicle, Theodore W., 4,715,586, Cl. 266-275.000.

Betthauser, Joseph L.: *See*—
Wills, Harry D.; and Betthauser, Joseph L., 4,716,297, Cl. 250-551.000.

Betz Laboratories, Inc.: *See*—
Schellhamer, Alan J.; Barnett, Daniel J.; and Khan, Abdul Q., 4,715,931, Cl. 162-199.000.

Bhagavatula, Venkata A., to Corning Glass Works. Low dispersion, low-loss single-mode optical waveguide. 4,715,679, Cl. 350-96.330.

Bhargava, Vikram, to Hayes Microcomputer Products, Inc. Enclosed circuit board assembly. 4,716,499, Cl. 361-395.000.

Bhattacharyya, Bhupati R.; Srivatsa, Sanjay R.; and Dwyer, Michael L., to Nalco Chemical Company. Ampholytic diallyldimethyl ammonium chloride (DADMAC) copolymers and terpolymers for water clarification. 4,715,962, Cl. 210-708.000.

Biale, John, to Union Oil Company of California. Multi-layered ionomer-vinylidene chloride contact laminated structures. 4,716,085, Cl. 428-476.900.

Bianca, Joseph D.; and Anderson, David K., to Combustion Engineering, Inc. Low excess air tangential firing system. 4,715,301, Cl. 110-347.000.

Biber, Klaus; and Unold, Gerhard, to Carl-Zeiss-Stiftung. Light trap for surgical operation microscopes. 4,715,704, Cl. 351-207.000.

BICC Public Limited Company: *See*—
Collier, John C.; and Davies, Keith, 4,715,826, Cl. 439-438.000.

Bicknell, John, to Bonar Bray Limited. Motor monitor synchronization system. 4,716,351, Cl. 318-600.000.

Biedermann, Jean-Michel: *See*—
Le Page, Jean-Francois; Billon, Alain; Morel, Frederic; Renard, Pierre; Biedermann, Jean-Michel; Laborde, Michel; and Bousquet, Jacques, 4,715,946, Cl. 208-45.000.

Biehl, Gerd: *See*—
Schelhas, Klaus-Dieter; and Biehl, Gerd, 4,715,859, Cl. 623-22.000.

Bienz, Wilford L.: *See*—
Jaksa, Tibor S.; Norton, Richard F.; Hall, Kenneth W.; Butler, Stephen J.; Chicoine, Craig C.; and Bienz, Wilford L., 4,715,103, Cl. 29-156.40R.

Biernoth, Gerhard; Menz, Hans-Udo; Todt, Klaus H.; and Wieske, Theophil, to Lever Brothers Company. Fat blends containing milk fat or a milk fat fraction and non-milk fat, and spreads containing said fat blends. 4,716,047, Cl. 426-603.000.

Billings, Roger E. Method and apparatus for electrolyzing water. 4,715,938, Cl. 204-129.000.

Billon, Alain: *See*—
Le Page, Jean-Francois; Billon, Alain; Morel, Frederic; Renard, Pierre; Biedermann, Jean-Michel; Laborde, Michel; and Bousquet, Jacques, 4,715,946, Cl. 208-45.000.

Biogen N.V.: *See*—
Panayotatos, Nikos, 4,716,112, Cl. 435-68.000.

Bishop, Arthur E.; Roeske, Klaus J.; and Scott, David W. Method for making steering rack bars. 4,715,210, Cl. 72-400.000.

Bitha, Panayota; Child, Ralph G.; Hlavka, Joseph J.; and Lin, Yang-I, to American Cyanamid Company. Heterocyclic-1,2-diamine platinum complexes. 4,716,157, Cl. 514-184.000.

Bixler, Kenneth D., to Packaging Corporation of America. Beak-type carton lock. 4,715,529, Cl. 229-2.50R.

Bjarnason, Jon: *See*—
Mariusson, Oskar; and Bjarnason, Jon, 4,716,188, Cl. 524-268.000.

Black & Decker, Inc.: *See*—
Hurn, Richard L.; and Sell, Michael R., 4,716,352, Cl. 320-2.000.
Sanders, Anthony J., 4,715,732, Cl. 384-320.000.

Black, Jimmy C.: *See*—
Roberts, Bruce E.; Black, Jimmy C.; and Matlock, Dyer A., 4,716,071, Cl. 428-209.000.

Blackburn, Martin J.; and Smith, Michael P., to United Technologies Corporation. Titanium aluminum alloys containing niobium, vanadium and molybdenum. 4,716,020, Cl. 420-418.000.

Blacklaws, John E.: *See*—
Teng, Chuan C.; Chapelle, Rene A.; Blacklaws, John E.; and McComsey, Lee E., 4,715,454, Cl. 175-299.000.

Blad, Per A.; and Johansson, Rolf, to AGA Aktiebolag. Method of attaching a connection piece to a metal surface by brazing. 4,716,272, Cl. 219-129.000.

Blair, Boyton T., to Engineering & Colloid, Ltd. Well drilling and completion composition. 4,715,971, Cl. 252-8.510.

Blake, Peter H.: *See*—
Peltz, Curtis L.; Martin, George F.; and Blake, Peter H., 4,716,542, Cl. 364-900.000.

Blanchard, Kenneth E.; and Sanislo, Stephen V., Jr., to Phonetics, Inc.; and Wisconsin Bell, Inc. Digital and synthesized speech alarm system. 4,716,582, Cl. 379-28.000.

Blanchard, Robert L., to Foxboro Company, The. Measurement calibration. 4,716,536, Cl. 364-571.000.

Blank, Robert G.; and Miller, Ronald W., to American Home Products Corporation. Stabilized coated aspirin tablets. 4,716,042, Cl. 424-474.000.

Bleris: *See*—
Arnoux, Daniel; Genter, Claude; Anton, Christian; and Forme, Jacques, 4,716,412, Cl. 340-753.000.

Blitshteyn, Mark; and Wright, William S., to Simco Company, Inc., The. Non-contact autoranging electrostatic fieldmeter with automatic distance indicator. 4,716,371, Cl. 324-457.000.

Block, Myron J.; and Hirschfeld, Tomas B., to Ord, Inc. Fluorescent assays, including immunoassays, with feature of flowing sample. 4,716,121, Cl. 436-514.000.

Bloxwich Lock and Stamping Company Limited, The: *See*—
Morris, Barry S., 4,715,090, Cl. 16-261.000.

Bluma, David A.: *See*—
Nolan, Dennis C.; and Bluma, David A., 4,716,348, Cl. 318-479.000.

Blumstein, Robert M.: *See*—
Kapoor, Anoop; Choby, Edward J.; Kramer, Thomas J.; Ranieri, James E.; Roth, Charles H., Jr.; Scheffer, Donald E.; Spehar, John E., Jr.; Bessko, Csaba; and Blumstein, Robert M., 4,715,111, Cl. 29-723.000.

BMC Manufacturing Inc.: *See*—
Schurch, Richard C., 4,715,508, Cl. 220-7.000.

Boateng, Daniel A. D.: *See*—
Ball, Donald L.; and Boateng, Daniel A. D., 4,715,939, Cl. 204-182.400.

Boatwright, David A.; and Widener, Wade H., to Westinghouse Electric Corp. End plug with truncated tapered leading end configuration. 4,716,018, Cl. 376-451.000.

BOC Group plc, The: *See*—
Clow, Dereck, 4,715,998, Cl. 261-142.000.

Boden, Richard M.: *See*—
Fujioka, Futoshi; Boden, Richard M.; and Schreiber, William L., 4,715,981, Cl. 252-174.110.

Bodine, Albert G. Sonic method for facilitating the fracturing of earthen formations in well bore holes. 4,716,555, Cl. 367-35.000.

Boehringer Mannheim GmbH: *See*—
Rehner, Helmut; and Roeschlau, Peter, 4,716,119, Cl. 436-16.000.

Boeing Company, The: *See*—
Cross, Dan A., 4,715,100, Cl. 29-33.00M.
Knoll, Frederick L., 4,715,923, Cl. 156-380.900.
Moji, Yukimori; and Taylor, Richard Q., 4,716,067, Cl. 428-117.000.
Nordlund, Lester H., 4,716,399, Cl. 340-365.00P.
Wiegenstein, John H., 4,715,203, Cl. 72-30.000.

Boets, Marc J.: *See*—
Heylen, Raymond A.; and Boets, Marc J., 4,715,500, Cl. 206-397.000.

Bogdanovsky, Valentin A.: *See*—
Paton, Boris E.; Vasiliev, Vsevolod V.; Bogdanovsky, Valentin A.; Danilyak, Sergei N.; Gavva, Viktor M.; Roiko, Jury P.; and Nushko, Valery A., 4,716,273, Cl. 219-130.010.

Bogucki-Land, Bogdan, to Karl Mayer textilmaschinenfabrik. Arrangement for the entanglement of multi-filament threads. 4,715,097, Cl. 28-172.000.

Bohl, Phillip B.; Gillette, Rodney J.; and Smith, James C., to Caterpillar Inc. Engine ignition system with an insulated and extendable extender. 4,715,337, Cl. 123-169.0PA.

Bohlen, Dietrich, to Nestec S.A. Pack comprising an outer rigid envelope and an inner flexible envelope. 4,715,511, Cl. 220-403.000.

Bokalot, Jean, to Societe Nationale Industrielle Aerospatiale. Mechanism for automatically actuating a rescue device upon opening of an exit door. 4,715,562, Cl. 244-137.200.

Bollands, Martin A.; Pike, William C.; Thukral, Prem S.; and Woolmington, Timothy P., to British Petroleum Company p.l.c., The. Drill shoe. 4,715,455, Cl. 175-402.000.

Bomhard, Andreas: *See*—
Heider, Joachim; Hauel, Norbert; Austel, Volkhard; Noll, Klaus; Bomhard, Andreas; van Meel, Jacques; and Diederen, Willi, 4,716,169, Cl. 514-299.000.

Bonar Bray Limited: *See*—
Bicknell, John, 4,716,351, Cl. 318-600.000.

Bond, Irvin D. Apparatus for turning a workpiece over along a twisting path of motion. 4,715,242, Cl. 74-102.000.

Bonelli, Fabio; Pessi, Antonello; and Verdini, Antonio S., to Enichem S.p.A.; and Eniricerche S.p.A. Partially modified, retro-inverso neurotensin analogs. 4,716,149, Cl. 514-13.000.

Bongers, Antonius J. P.: *See*—
Gaymans, Reinoud J.; and Bongers, Antonius J. P., 4,716,214, Cl. 528-335.000.

Boone, Terry. Carburetion system and method for vaporizing fuel and for mixing vaporized heated fuel with air to power an internal combustion engine. 4,715,997, Cl. 261-142.000.

Booth, Michael; and Penneck, Richard J., to Raychem Limited. Method of making coaxial cable. 4,715,098, Cl. 29-25.350.

Boots-Celltech Diagnostics Limited: *See—*
Baker, Terence S.; Powell, Michael J.; and Titmas, Richard C., 4,716,109, Cl. 435-7.000.

Bores, Leonard F.; and Zdziarski, Mark J., to ASC Incorporated. Locator and hold-down latch for removable vehicle roof panels. 4,715,649, Cl. 296-218.000.

Borg-Warner Corporation: *See—*
Fox, Clarence D., 4,715,396, Cl. 137-82.000.

Borras, Jaime Andres, to Motorola, Inc. Trunked communication system true priority channel scan. 4,716,407, Cl. 340-825.040.

Borsos nee Safranek, Iren: *See—*
Timar, Tibor; Zsupan, Kalman; Repasi, Janos; Borsos nee Safranek, Iren; Kiss, Istvan; Fodor, Amdras; and Maroy, Peter, 4,716,238, Cl. 549-408.000.

Bossenmaier, Alban: *See—*
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Boston University, Trustees of: *See—*
Osband, Michal E.; and Cavagnaro, Joy A., 4,716,111, Cl. 435-68.000.

Boudreau, Robert A., to GTE Products Corporation. Mask for patterning electrode structures in thin film EL devices. 4,715,940, Cl. 204-192.100.

Bourgoine, Edward: *See—*
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Bousquet, Jacques: *See—*
Le Page, Jean-Francois; Billon, Alain; Morel, Frederic; Renard, Pierre; Biedermann, Jean-Michel; Laborde, Michel; and Bousquet, Jacques, 4,715,946, Cl. 208-45.000.

Bouvart, Francois. Convertible craft. 4,715,312, Cl. 114-352.000.

Bowen Tools, Inc.: *See—*
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Bowman, Gary K., to Ingenuity Unlimited, Inc. Septic tank sludge level indicator. 4,715,966, Cl. 210-800.000.

Bowman, Wayne A.: *See—*
Vanier, Noel R.; Lum, Kin K.; and Bowman, Wayne A., 4,716,144, Cl. 503-227.000.

Boxell, Timothy G.; Bardsley, Frank B.; and Stoddart, David E., to Gearhart Tesel Limited. Downhole tools. 4,715,440, Cl. 166-100.000.

Brambilla, Luigi: *See—*
Baumann, Karl-Heinz; Schick, Gerald; Kassing, Lothar; Bossenmaier, Alban; and Brambilla, Luigi, 4,715,468, Cl. 180-271.000.

Bramlage Gesellschaft mit beschrankter Haftung: *See—*
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Brandes, Wilhelm: *See—*
Fest, Christa; Brandes, Wilhelm; Hanssler, Gerd; and Reinecke, Paul, 4,716,176, Cl. 514-477.000.
Kramer, Wolfgang; Buchel, Karl H.; Frohberger, Paul-Ernst; Brandes, Wilhelm; and Lurssen, Klaus, 4,715,887, Cl. 71-92.000.

Brandon, Craig A.: *See—*
Thomas, Ronald L.; Titus, Terry C.; and Brandon, Craig A., 4,716,044, Cl. 426-51.000.

Brandt, Inc.: *See—*
Taylor, Lawrence D., 4,716,286, Cl. 250-214.00R.

Braun, Ernst: *See—*
Braun, Gert; and Braun, Ernst, 4,715,658, Cl. 299-34.000.

Braun, Gert; and Braun, Ernst, to Halbach & Braun Industrieanlagen. Planing machine for the mining of minerals. 4,715,658, Cl. 299-34.000.

Braunecker, Bernhard: *See—*
Gaechter, Bernhard; Braunecker, Bernhard; and Muller, Fritz, 4,715,714, Cl. 356-375.000.

Brechbuhler, Fritz: *See—*
Ramseier, Hans-Ulrich; and Brechbuhler, Fritz, 4,715,314, Cl. 118-631.000.

Bredeweg, Robert A.: *See—*
Coyne, Brenton S.; Strandjord, Andrew J.; Spence, Mark W.; Willis, Reid S.; Bredeweg, Robert A.; and Stevens, Timothy S., 4,715,217, Cl. 73-61.10C.

Breed Corporation: *See—*
Breed, David, 4,715,617, Cl. 280-731.000.

Breed, David, to Breed Corporation. Passenger compartment sensor with low bias. 4,715,617, Cl. 280-731.000.

Bregnard, Andre : *See—*
Place, John; and Bregnard, Andre , 4,715,943, Cl. 204-299.00R.

Breu, Johann, to Rockinger Spezialfabrik fur Anhangerkupplungen GmbH & Co. Mounting of the coupling body of a trailer coupling in the cross-piece. 4,715,611, Cl. 280-504.000.

Bridges, Jeffrey M., to Texas Instruments Incorporated. Method of forming a high density vertical stud titanium silicide for reachup contact applications. 4,715,109, Cl. 437-200.000.

Bridgestone Corporation: *See—*
Kawasaki, Kiyohito; Sato, Michitaka; Koseki, Hiroyuki; and Matsunuma, Tamotsu, 4,715,419, Cl. 152-527.000.

Briggs Manufacturing, Inc.: *See—*
Briggs, Stanley E., 4,715,302, Cl. 111-1.000.

Briggs, Paul C.: *See—*
Broomfield, Donald J.; Briggs, Paul C.; Parker, Eric G.; and Wagner, David P., 4,715,316, Cl. 118-716.000.

Briggs, Stanley E., to Briggs Manufacturing, Inc. Foldable drill implement with differential assembly. 4,715,302, Cl. 111-1.000.

Brigham & Women's Hospital: *See—*
Patz, H. Samuel, 4,716,367, Cl. 324-309.000.

Bright, Edward J.; and Sinisi, David B., to AMP Incorporated. Retention system for removable heat sink. 4,716,494, Cl. 361-386.000.

Brightwell, Lionel L., to Trus Joist Corporation. Wooden joist with web members having cut tapered edges and vent slots. 4,715,162, Cl. 52-729.000.

Brine, Satya S.; Baines, John H.; and Poulin, Suzanne C. M. Child resistant cabinet lock combination finger lock. 4,715,628, Cl. 292-19.000.

Bringmann, Udo; Drews, Klaus; and Schon, Detlef, to U.S. Philips Corporation. Device for coating a substrate by means of plasma-CVD or cathode sputtering. 4,715,319, Cl. 118-723.000.

Brink, Douglas F.; and MacConnell, John, to Benchmark Ventures. Cup holder. 4,715,633, Cl. 294-31.200.

Brisson, Alfred G.: *See—*
Nowacki, Christopher; and Brisson, Alfred G., 4,715,375, Cl. 128-328.000.
Nowacki, Christopher; and Brisson, Alfred G., 4,715,376, Cl. 128-328.000.

British Petroleum Company p.l.c., The: *See—*
Dollands, Martin A.; Pike, William C.; Thukral, Prem S.; and Woolmington, Timothy P., 4,715,455, Cl. 175-402.000.

Brock, J. Donald, to Astec Industries, Inc. Drum mix asphalt plant with knock-out box and separate pugmill coater. 4,715,720, Cl. 366-25.000.

Bronowski, Helmut; and Dahlke, Christian, to J. M. Voith GmbH. Cover for turbines and pumps. 4,715,781, Cl. 415-219.00C.

Broomfield, Donald J.; Briggs, Paul C.; Parker, Eric G.; and Wagner, David P., to Illinois Tool Works Inc. Apparatus for plating and coating. 4,715,316, Cl. 118-716.000.

Brosch, Richard W., to Lymore Limited. Casting mould. 4,715,425, Cl. 164-418.000.

Brosius, Klaus, to J. M. Voith GmbH. Hydrodynamic retarder. 4,715,481, Cl. 188-291.000.

Brother Kogyo Kabushiki Kaisha: *See—*
Kuzuya, Susumu; and Imaizumi, Mamoru, 4,715,735, Cl. 400-82.000.

Brown, Alan P. B.; and Reeves, Ian B., to Brown, Alan Paul Blakley. Breaker pad. 4,715,424, Cl. 164-264.000.

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Brown, Alan P. B.; and Reeves, Ian B., 4,715,424, Cl. 164-264.000.

Brown, Carl H.: *See—*
Benson, David J.; Brown , H.; and Hancock, William R., 4,716,460, Cl. 358-140.000.

Brown, James E., Jr.: *See—*
Muller, Gary R.; Theiss, Scott M.; Brown, James E., Jr.; and Lawson, Bobby R., 4,715,324, Cl. 122-381.000.

Browning, Ervin R. Hoist for installing cabinets, ceiling frames and the like. 4,715,760, Cl. 414-10.000.

Brulet, Daniel, to Societe d'Extrusion et de Transformation. Process for the preparation in microsuspension of a vinyl chloride polymer latex and resultant products. 4,716,195, Cl. 524-851.000.

Bryant, David R.: *See—*
Abatjoglou, Anthony G.; and Bryant, David R., 4,716,250, Cl. 568-454.000.

Bseisu, Amjad A.; Jan, Yih-Min; and Schuh, Frank J., to Atlantic Richfield Company. Measuring drillstem loading and behavior. 4,715,451, Cl. 175-40.000.

Buchel, Karl H.: *See—*
Kramer, Wolfgang; Buchel, Karl H.; Frohberger, Paul-Ernst; Brandes, Wilhelm; and Lurssen, Klaus, 4,715,887, Cl. 71-92.000.

Buchl, Josef. Electromagnetically-actuated positioning mechanism. 4,715,330, Cl. 123-90.110.

Buchser, William J., to Whirlpool Corporation. Insulated cabinet manufacture. 4,715,512, Cl. 220-465.000.

Buckley, James A. V., to Hayes Industrial Brake, Inc. Retraction type support assembly for a floating caliper disc brake. 4,715,479, Cl. 188-71.800.

Bucksbee, James H.; and Siwek, Casimir K. Rail fastener assembly with horizontal flanges. 4,715,533, Cl. 238-283.000.

Buente, Stephen M.; and Hillebrand, George A., to Eaton Corporation. Self contained hydraulic bucket lifter. 4,715,334, Cl. 123-90.580.

Buettner, Carl F. Flow measuring system with backflow preventing means. 4,715,232, Cl. 73-861.490.

Buhler, Gerhard, to Fryma Maschinen A.G. Rheinfelden. Ball mill. 4,715,547, Cl. 241-176.000.

Bulso, Joseph D., Jr.; and McClung, James A., to Redicon Corporation. Method and apparatus for forming end panels for containers. 4,715,208, Cl. 72-348.000.

Buma, Shuuichi: *See—*
Asami, Ken; Ohashi, Kaoru; Onuma, Toshio; and Buma, Shuuichi, 4,715,616, Cl. 280-707.000.

Burford, Charles E., to Burford Corp. Dispenser for particulate material. 4,715,315, Cl. 118-684.000.

Burford Corp.: *See—*
Burford, Charles E., 4,715,315, Cl. 118-684.000.

Burgdorf, Jochen; and Weisbrod, Helmut, to International Standard Electric Corporation. Low-wear frictionally engaging device. 4,715,486, Cl. 192-107.00M.

Burgman, Herbert A.: *See—*
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Burke, Paul. Process for producing a plastic laminate of low density polymeric material and high density polymeric material and laminate made thereof. 4,716,069, Cl. 428-167.000.

Burkhard, Joseph D.: *See—*
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Burman, Denis L.: *See*—
Demario, Edmund E.; Burman, Denis L.; Olson, Carl A.; and Secker, Jeffrey R., 4,716,016, Cl. 376-446.000.

Burmeister, Fredrik K. Pneumatic mattress track system for vehicles. 4,715,668, Cl. 305-34.000.

Burris, James L.: *See*—
Christ, Christy; Campbell, Herbert F.; Fields, Gayle P.; and Burris, James L., 4,716,075, Cl. 428-285.000.

Burrus, Gilbert S., Jr.; Cooper, Ronald J.; Marr, Michael R.; Pescatore, John C.; and Marsico, Mario A., to International Business Machines Corporation. Multiple port integrated DMA and interrupt controller and arbitrator. 4,716,523, Cl. 364-200.000.

Burt, Johanna. Educational game apparatus. 4,715,608, Cl. 273-248.000.

Burton, Richard J.: *See*—
Allan, Jonathan M.; Burton, Richard J.; and Jurock, Volker, 4,715,959, Cl. 210-637.000.

Burton, Rodney L.: *See*—
Goldstein, Yeshayahu S. A.; Tidman, Derek A.; Burton, Rodney L.; Massey, Dennis W.; and Winsor, Niels K., 4,715,261, Cl. 89-8.000.

Busch, Edgar; Schilling, Lothar; and Ziegler, Klaus, to Pfaff Industriemaschinen GmbH. Lubricating device for sewing and embroidering machines. 4,715,303, Cl. 112-256.000.

Bussiere, Ronald L.; and Smith, Robert J., to Surgicorp. Apparatus for curing dental restorative composites. 4,716,296, Cl. 250-504.00R.

Butler L., Diego, to Deflecta-Shield Corp. Rear window louver for pickup trucks and method for making same. 4,715,643, Cl. 296-97.00A.

Butler, Stephen J.: *See*—
Jaksa, Tibor S.; Norton, Richard F.; Hall, Kenneth W.; Butler, Stephen J.; Chicoine, Craig C.; and Bienz, Wilford L., 4,715,103, Cl. 29-156.40R.

Butler, Wilbur T. Tiltable bed frame assembly. 4,715,073, Cl. 5-62.000.

Butts, Gary, to Ling Electronics, Inc. Apparatus for vibration testing. 4,715,229, Cl. 73-663.000.

Bye, Richard L., Jr.: *See*—
Skinner, David J.; Bye, Richard L., Jr.; Okazaki, Kenji; and Adam, Colin M., 4,715,893, Cl. 75-249.000.

Byers, Gary W.: *See*—
Vanier, Noel R.; Byers, Gary W.; and Weber, Helmut, 4,716,145, Cl. 503-227.000.

Byers, Thomas L. Photographic image precision reproportioning system. 4,716,443, Cl. 355-84.000.

Byrd, William A.; and Smith, Anthony R., to Sundstrand Corporation. Self-scavenging gear box lubrication system. 4,715,244, Cl. 74-467.000.

C. R. Bard, Inc.: *See*—
Elliott, Donald P.; and Halseth, William L., 4,715,856, Cl. 604-321.000.

Calder, Oliver J., to Graham, Phyllis. Spray tip. 4,715,537, Cl. 239-119.000.

Calenoff, Emanuel: *See*—
Tsay, Yuh-Geng; Beigler, Myron A.; Calenoff, Emanuel; Friesen, Gerald L.; and Nichols, James L., 4,716,120, Cl. 436-513.000.

Calgene, Inc.: *See*—
Thompson, Gregory A.; and Davies, Huw M., 4,716,101, Cl. 435-4.000.

Calgon Carbon Corporation: *See*—
Vo, Toan P., 4,715,867, Cl. 55-26.000.

California Institute of Technology: *See*—
Mead, Carver A.; and Wawrzynek, John C., 4,716,312, Cl. 307-475.000.

Caligaris Cappio, Emilio: *See*—
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Camara, Michael A.: *See*—
Steltenkamp, Robert J.; and Camara, Michael A., 4,715,862, Cl. 8-137.000.
Steltenkamp, Robert J.; and Camara, Michael A., 4,715,970, Cl. 252-8.800.

Cambridge Instruments Inc.: *See*—
John, Puthenpurackal K.; and Shoemaker, Arthur H., 4,715,697, Cl. 350-502.000.

Campbell, Charles M.: *See*—
Fair, Kenneth E.; and Campbell, Charles M., 4,715,558, Cl. 242-199.000.

Campbell, David L., to Advanced Micro Devices, Inc. High-current operational amplifier. 4,716,381, Cl. 330-256.000.

Campbell, Herbert F.: *See*—
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Canadian Marconi Company: *See*—
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Canella, Vincent D.: *See*—
Yaniv, Zvi; Canella, Vincent D.; Chapelle, Walter E.; and Pryor, Roger W., 4,715,685, Cl. 350-332.000.

Canon Kabushiki Kaisha: *See*—
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Alyfuku, Kiyoshi, 4,716,433, Cl. 354-468.000.
Arai, Takashi, 4,715,802, Cl. 425-130.000.
Ishihara, Shunichi; Ohno, Shigeru; Kanai, Masahiro; Oda, Shunri; and Shimizu, Isamu, 4,716,048, Cl. 427-39.000.
Ito, Yuji, 4,715,708, Cl. 356-72.000.
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Ozawa, Kunitaka; Nakamura, Takashi; Katayama, Akira; Hatanaka, Katsunori; Mori, Tetsuzo; and Takaoka, Makoto, 4,716,421, Cl. 346-140.00R.
Sakuragi, Takamasa; and Fushimi, Ikuo, 4,716,305, Cl. 307-296.00R.
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Tezuka, Nobuo, 4,716,481, Cl. 360-106.000.
Tokura, Go; Arakawa, Kazuhiko; and Terashima, Jun, 4,716,259, Cl. 174-68.500.
Uehara, Haruo; and Omata, Hiroshi, 4,716,063, Cl. 428-65.000.
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Yamada, Yasuyuki; Fujibayashi, Kazuo; Sato, Yasuhisa; and Yokota, Hideo, 4,715,692, Cl. 350-422.000.
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Yoshihara, Toshiyuki; Hiro, Masaaki; and Watanabe, Katsunori, 4,716,091, Cl. 430-66.000.

Canterino, Peter J.; Dobreski, David V.; and Shaw, Richard G., to Mobil Oil Corporation. Films of blends of linear ethylene polymers and aromatic polymers. 4,716,201, Cl. 525-240.000.

Cantineau, Bertrand J., to Westinghouse Electric Corp. Moisture separator for steam generator level measurement system. 4,716,014, Cl. 376-371.000.

Cantor, Joshua C.: *See*—
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Cantrell, Larry K.; and Smith, Edwin J., to Grant Machinery Inc. Paperboard sheet feeder. 4,715,596, Cl. 271-116.000.

Capizzi, Amedeo; Spinelli, Pia; and Arsura, Emilio, to Montedison S.p.A. Dispenser for the slow release of volatile products. 4,715,536, Cl. 239-54.000.

Cappe, Alain; and Nabet, Claude, to Thermababy, S.A. Apparatus for warming up and sterilizing babies bottles. 4,716,278, Cl. 219-521.000.

Capps, Lloyd O. Boat trailer guide. 4,715,768, Cl. 414-535.000.

Carkhuff, Donald W., to L-TEC Company. Plasma arc torch having supplemental electrode cooling mechanisms. 4,716,269, Cl. 219-121.0PQ.

Carl-Zeiss-Stiftung: *See*—
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Carlsen, William F., Jr.: *See*—
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Carlson, William R.; and Piplica, Eugene J., to Westinghouse Electric Corp. Spectral shift reactor. 4,716,007, Cl. 376-209.000.

Carlson, William R., to Westinghouse Electric Corp. Modular nuclear fuel assembly design. 4,716,015, Cl. 376-445.000.

Carmosin, Richard J.; and Carson, John R., to McNeilab, Inc. 4-substituted octahydroquinolizine analgesic compounds and octahydroquinolizinium intermediates. 4,716,172, Cl. 514-306.000.

Carr, Kenneth L., to M/A-Com, Inc. Non-invasive temperature monitor. 4,715,727, Cl. 374-122.000.

Carraro, Eugene; and Laughlin, Raymond S., to Erico International Corporation. Suspended ceiling grid clip. 4,715,161, Cl. 52-714.000.

Carse, Gregg D.; and Daines, Bernard N., to Pacific Bell. Telephone system. 4,716,562, Cl. 370-110.100.

Carson, John R.: *See*—
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Caruthers, Marvin H.; Leineweber, Michael; Leitner, Moshe; and Stabinsky, Yitzhak, to University Patents, Inc. Hybrid lymphoblastoid-leukocyte human interferons. 4,716,217, Cl. 530-351.000.

Carver, George C.: *See*—
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Casey, Donald J.; Jarrett, Peter K.; and Rosati, Louis, to American Cyanamid Company. Diblock and triblock copolymers. 4,716,203, Cl. 525-408.000.

Casey, Walter P., Jr. Reverse osmosis water purification element and cartridge. 4,715,952, Cl. 210-136.000.

Casio Computer Co., Ltd.: *See*—
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Cassette, Angelo J.: *See*—
Gallo, Frank G.; Swenson, Clark E.; Bencloski, William A.; Cassette, Angelo J.; Manno, John L.; and Parlak, Edward A., 4,716,010, Cl. 376-260.000.

Catena, Nicola, to Fata European Group S.p.A. Apparatus for the overhead transportation of heavy loads on a monorail. 4,715,288, Cl. 105-154.000.

Caterpillar Inc.: *See*—
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Palmer, Marvin K., 4,715,641, Cl. 294-119.400.

Cavagnaro, Joy A.: *See*—
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CD Medical Inc.: *See*—
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CDP, Ltd.: *See—*
Ecer, Gunes M., 4,715,313, Cl. 118-105.000.
Centre de Recherche Industrielle du Quebec: *See—*
Altounian, George N.; and Grenier, Daniel, 4,716,213, Cl. 528-283.000.
Cestero, Luis G. Device to convert piston-reciprocating internal combustion engines to compressed air motors. 4,715,181, Cl. 60-412.000.
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Chamberlain, William: *See—*
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Chamberlin, James C. Electrical junction box with manipulatable ends. 4,715,507, Cl. 220-3.940.
Chambers, Francis T. Robotic hand with slip couplings. 4,715,638, Cl. 294-88.000.
Chan, C. S.; and Hay, Robert R., to Hewlett-Packard Company. Barrier layer and orifice plate for thermal ink jet print head assembly and method of manufacture. 4,716,423, Cl. 346-140.00R.
Chan, Shui L. D., to New Horizons Product Development Company Limited. Table lamps. 4,716,505, Cl. 362-287.000.
Chanda, Subir; Riedhammer, Thomas M.; and Tometsko, Andrew M. Liquid cleaner containing inactivated protease for protein soiled contact lenses. 4,715,899, Cl. 134-26.000.
Chang, Long F.; and Steele, Scott W., to Owen-Illinois Plastic Products Inc. Oriented plastic container. 4,715,504, Cl. 215-1.00C.
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Chappell, Richard L.; and Chappell, Alice M., to Fine Lines International Ltd. Fluorescent display base. 4,716,503, Cl. 362-97.000.
Charboneau, Thomas J.; and Kawate, Keith W., to Texas Instruments Incorporated. Pressure sensor with improved capacitive pressure transducer. 4,716,492, Cl. 361-283.000.
Charcoal Cloth Ltd.: *See—*
Juhasz, Laszlo; and McLeod, Angus I., 4,715,857, Cl. 604-359.000.
Chartier, Michael S.: *See—*
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Chen, Li-Fu; and Hoff, Johan E., to Purdue Research Foundation. Grain extraction milling. 4,716,218, Cl. 530-372.000.
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Fogel, Isaac; and Keefer, Donald W., 4,715,076, Cl. 5-450.000.
Clemson University: *See—*
Parker, Joey K.; and Paul, Frank W., 4,715,773, Cl. 414-730.000.
Thomas, Ronald L.; Titus, Terry C.; and Brandon, Craig A., 4,716,044, Cl. 426-51.000.
Clendinning, Robert A.; and Maresca, Louis M., to Amoco Corporation. Slurry process for producing high molecular weight crystalline polyaryletherketones. 4,716,211, Cl. 528-126.000.
Cleophax, Jeanine: *See—*
Gero, Stephane; Cleophax, Jeanine; and Gateau-Olesker, Alice, 4,716,226, Cl. 540-200.000.
Clevite Industries Inc.: *See—*
Aranovich, Felix, 4,715,407, Cl. 137-625.650.
Clow, Dereck, to BOC Group plc, The. Inhalation apparatus. 4,715,998, Cl. 261-142.000.
Cobb, Raymond L., to Phillips Petroleum Company. Preparation of aromatic iodine compounds. 4,716,254, Cl. 570-147.000.
Cobbs, Richard W. Body-supported hand-operated instrument desk. 4,715,293, Cl. 108-43.000.
Cobe Laboratories, Inc.: *See—*
Shouldice, David R.; and Treu, Dennis M., 4,715,398, Cl. 137-171.000.
Cofimco S.p.A.: *See—*
Mosiewicz, Antonio, 4,715,784, Cl. 416-208.000.
Cogan, Adrian I., to Siliconix Incorporated. Fabrication of double diffused metal oxide semiconductor transistor. 4,716,126, Cl. 437-24.000.
Cogan, Kevin C.; Ouellette, Edward L.; and Morua, Martin, to Frito-Lay, Inc. Corn-water slurry separator device. 4,715,957, Cl. 210-497.300.
Cogent Limited: *See—*
Harris, William J.; and Hart, Helena F., 4,716,104, Cl. 435-5.000.
Cohen, Irun R.: *See—*
Stanford, John L.; Cohen, Irun R.; Frenkel, Ayala; Holoshitz, Joseph; van Eden, Willem; and Rook, Graham A. W., 4,716,038, Cl. 424-92.000.
Colavito, William; and Riggins, Christa. Numeric color coded filing system. 4,715,621, Cl. 283-36.000.
Cole-Parmer Instrument Company: *See—*
Wolff, Donald L.; McCauley, Porter T.; Stiefel, Paul; Takacs, Gyoergy J.; and Adams, Roman A., 4,715,786, Cl. 417-22.000.
Colgate-Palmolive Company: *See—*
Crossin, Michael C., 4,715,990, Cl. 252-551.000.
Rothanavibhata, Adam A.; and Payne, Richard K., 4,715,969, Cl. 252-8.700.
Schelm, Sandra L., 4,716,034, Cl. 424-49.000.
Schelm, Sandra L., 4,716,036, Cl. 424-57.000.
Steltenkamp, Robert J.; and Camara, Michael A., 4,715,862, Cl. 8-137.000.
Steltenkamp, Robert J.; and Camara, Michael A., 4,715,970, Cl. 252-8.800.
Colin, David, to Amersham International plc. Standard for analysis. 4,715,988, Cl. 252-408.100.
Colin, Dennis P., to Varian Associates, Inc. Full wave, self-detecting differential logarithmic rf amplifier. 4,716,316, Cl. 307-492.000.
Collier, John C.; and Davies, Keith, to BICC Public Limited Company. Circuit board connector. 4,715,826, Cl. 439-438.000.
Coloney, Wayne H. Aircraft fuel tank. 4,715,417, Cl. 150-55.000.

Colorado State University Research Foundation: *See*—
Macy, Dennis W., 4,716,030, Cl. 424-9.000.
Combustion Engineering, Inc.: *See*—
Bianca, Joseph D.; and Anderson, David K., 4,715,301, Cl. 110-347.000.
Cominco Ltd.: *See*—
Ball, Donald L.; and Boateng, Daniel A. D., 4,715,939, Cl. 204-182.400.
Commereuc, Dominique: *See*—
Provin, Gerard; Forestiere, Alain; and Commereuc, Dominique, 4,716,239, Cl. 556-147.000.
Commissariat a l'Energie Atomique: *See*—
Diem, Bernard, 4,715,930, Cl. 437-101.000.
Rigoulot, Claude, 4,715,751, Cl. 409-139.000.
Compagnie Europeene de Composants Electroniques: *See*—
Bernard, Gilles; and Delalande, Francois, 4,715,118, Cl. 29-856.000.
Concurrent Computer Corporation: *See*—
Gilanyi, Robert A.; and Schmitt, Ralph H., 4,716,525, Cl. 364-200.000.
Connelly Skis, Inc.: *See*—
Horne, Kenneth A., 4,715,416, Cl. 150-52.00R.
Connon, Helen A.; Gorski, Robert A.; Kenyon, William G.; and Yokozeki, Akimichi, to Du Pont de Nemours, E. I., and Company. Azeotropic compositions of trichlorotrifluoroethane, dichlorodifluoroethane and methanol/ethanol. 4,715,900, Cl. 134-31.000.
Container Graphics Corporation: *See*—
Cooper, Larry L.; and Saunders, Philip G., 4,716,096, Cl. 430-323.000.
Contamin, Jean-Claude: *See*—
Zabotto, Arlette; and Contamin, Jean-Claude, 4,715,982, Cl. 252-174.170.
Continental Gummi-Werke Aktiengesellschaft: *See*—
Drescher, Gunter; Fankhanel, Gerhard; and Gnirk, Wolfgang, 4,715,588, Cl. 267-122.000.
Continua International Continuous Casting S.p.A.: *See*—
Klaucic, Luciano, 4,715,426, Cl. 164-426.000.
Controlled Release Technologies, Inc.: *See*—
Tran, Loi H., 4,715,850, Cl. 604-82.000.
Conway, Richard J.; Watson, Keith G.; and Farquharson, Graeme J., to Imperial Chemical Industries PLC. Herbicidal cyclohexane-1,3-dione derivatives. 4,715,884, Cl. 71-90.000.
Cook, Jeffrey A.; and Hamburg, Douglas R., to Ford Motor Company. Reduction of HC emissions for vapor recovery purge systems. 4,715,340, Cl. 123-406.000.
Cooper, Edward. AC voltage regulator with split primary switching. 4,716,357, Cl. 323-263.000.
Cooper, James A.: *See*—
Tommis, Norman; and Cooper, James A., 4,715,422, Cl. 164-97.000.
Cooper, Larry L.; and Saunders, Philip G., to Container Graphics Corporation. Method and apparatus for producing characters on a grit-erodible body. 4,716,096, Cl. 430-323.000.
Cooper, Ronald J.: *See*—
Burrus, Gilbert S., Jr.; Cooper, Ronald J.; Marr, Michael R.; Pescatore, John C.; and Marsico, Mario A., 4,716,523, Cl. 364-200.000.
Corning Glass Works: *See*—
Bhagavatula, Venkata A., 4,715,679, Cl. 350-96.330.
Montierth, Max R., 4,715,576, Cl. 249-60.000.
Montierth, Max R., 4,715,801, Cl. 425-110.000.
Rittler, Hermann L., 4,715,987, Cl. 252-315.500.
Cornsweet, Tom N.; and Hersh, Samuel, to Rodenstock Instrument Corporation. Ocular-fundus analyzer. 4,715,703, Cl. 351-205.000.
Cosmo Plastics Company: *See*—
Gordon, Albert, 4,716,394, Cl. 336-192.000.
Costello, Rocky C.; and Dixon, Robert L., to Stauffer Chemical Company. Method of disposing of materials by dissolving in acid and then incinerating. 4,715,300, Cl. 110-346.000.
Courtney, Mark G.: *See*—
Arnold, Allen J.; Courtney, Mark G.; Kirby, Diane N.; Mis, Katherine H.; and Sutton, Kerry L., 4,715,430, Cl. 165-80.300.
Coutelle, Charles: *See*—
Hunger, Hans-Dieter; and Coutelle, Charles, 4,716,103, Cl. 435-5.000.
Couwenberg, Franciscus A. C. M.; Groenenberg, Cornelis J.; and Wetjens, Antonius C. S., to Oce-Nederland B.V. Positioning device for sheet on exposure platen of a copying machine. 4,716,440, Cl. 355-14.0SH.
Covalent Technology Corporation: *See*—
Wood, David E., 4,716,123, Cl. 436-533.000.
Coyne, Brenton S.; Strandjord, Andrew J.; Spence, Mark W.; Willis, Reid S.; Bredeweg, Robert A.; and Stevens, Timothy S., to Dow Chemical Company, The. Determining organic compounds using a membrane. 4,715,217, Cl. 73-61.10C.
Cozewith, Charles; Ju, Shiaw; and Verstrate, Gary W., to Exxon Research & Engineering Co. Nodular copolymers comprising narrow MWD alpha-olefin copolymers coupled by non-conjugated dienes. 4,716,207, Cl. 526-169.200.
Craig, Clark E., to Valhi, Inc. Cylinder lock with removable plug. 4,715,201, Cl. 70-369.000.
Craker, Robert, to Allen-Bradley Company, Inc. Printer circuit board chassis with power interlock. 4,716,495, Cl. 361-391.000.
Craker, Robert, to Allen-Bradley Company, Inc. Printed circuit board module. 4,716,497, Cl. 361-395.000.
Crass, Guenther: *See*—
Seifried, Walter; and Crass, Guenther, 4,716,068, Cl. 428-141.000.
Crawford, Douglass W.; Crawford, William B.; and Crawford, Mark S. Side pocket mandrel. 4,715,441, Cl. 166-117.500.
Crawford, Mark S.: *See*—
Crawford, Douglass W.; Crawford, William B.; and Crawford, Mark S., 4,715,441, Cl. 166-117.500.
Crawford, William B.: *See*—
Crawford, Douglass W.; Crawford, William B.; and Crawford, Mark S., 4,715,441, Cl. 166-117.500.
Criss, Russell C.: *See*—
Gillery, F. Howard; Criss, Russell C.; and Finley, James J., 4,716,086, Cl. 428-630.000.
Crosfield Electronics Limited: *See*—
Roe, Malcolm D. M.; and Hicks, Michael E., 4,716,384, Cl. 332-7.510.
Cross, Dan A., to Boeing Company, The. Wire routing tool for robotic wire harness assembly. 4,715,100, Cl. 29-33.00M.
Cross, Peter: *See*—
Scifres, Donald R.; Cross, Peter; and Harnagel, Gary L., 4,716,568, Cl. 372-36.000.
Crossin, Michael C., to Colgate-Palmolive Company. Stable soil release promoting liquid detergent containing stabilized enzymes. 4,715,990, Cl. 252-551.000.
Crossley, Robert B. Multifunctional behavioral modification device for snoring, bruxism, and apnea. 4,715,367, Cl. 128-136.000.
Crus, Richard A.; Haderle, Donald J.; and Herron, Howard W., to International Business Machines Corporation. Method for managing lock escalation in a multiprocessing, multiprogramming environment. 4,716,528, Cl. 364-300.000.
Cselt - Centro Studi e Laboratori Telecomunicazioni S.p.A.: *See*—
Fausone, Alfredo; and Moncalvo, Agostino, 4,716,587, Cl. 380-10.000.
Cudahy, Michael J.; De La Huerga, Carlos; Arneson, Harold N.; Divers, R. Thomas; and Altman, Barry J., to Marquette Electronics, Inc. Patient monitoring system having transportable data module and display unit. 4,715,385, Cl. 128-710.000.
Cummings, Richard E.; Mackey, Charles S.; Dickinson, Robert W.; Dickinson, Ben W. O., III; and Larsen, Merle D., to Dickinson III, Ben Wade Oakes; and Dickinson, Robert Wayne. Curvature probe and method. 4,715,128, Cl. 33-544.000.
Curran, Kennth: *See*—
May, Richard L.; Smith, Jay; and Wolf, Harley, 4,715,602, Cl. 273-86.00R.
Curti, Carlo, to Sauer S.p.A. Plant for the production of popsicles and icecreams incorporating a holding stick. 4,715,193, Cl. 62-345.000.
Curtis, Walter B.; Davis, Gregory L.; and Klimowicz, Mark C., to Texaco Inc. Marine shock absorbing apparatus with stabilizers. 4,715,310, Cl. 114-220.000.
D. L. Auld Company, The: *See*—
Waugh, Robert E.; Nannig, Urban R.; and Rockwood, Clyde R., 4,716,052, Cl. 427-147.000.
Dahl, John H.: *See*—
Hulsizer, Philip N.; and Dahl, John H., 4,716,271, Cl. 219-125.110.
Dahlke, Christian: *See*—
Bronowski, Helmut; and Dahlke, Christian, 4,715,781, Cl. 415-219.00C.
Daicel Chemical Industries, Ltd.: *See*—
Murabayashi, Katuyoshi, 4,716,198, Cl. 525-92.000.
Daihatsu Motor Company Limited: *See*—
Miyake, Hiroshi, 4,715,540, Cl. 239-533.300.
Daikin Industries, Ltd.: *See*—
Fujimoto, Satoru, 4,716,347, Cl. 318-460.000.
Daimler-Benz Aktiengesellschaft: *See*—
Baumann, Karl-Heinz; Schick, Gerald; Kassing, Lothar; Bossenmaier, Alban; and Brambilla, Luigi, 4,715,468, Cl. 180-271.000.
Daines, Bernard N.: *See*—
Carse, Gregg D.; and Daines, Bernard N., 4,716,562, Cl. 370-110.100.
Dale Electronics, Inc.: *See*—
Kneifel, Jerome J., 4,716,396, Cl. 338-226.000.
Daley, Thomas R.: *See*—
Holming, Robert; Nelson, Robert S.; and Daley, Thomas R., 4,715,546, Cl. 241-171.000.
Daloz, Joanny. Device for metering a powdered, granular or liquid product, and apparatus including a device of the kind. 4,715,245, Cl. 74-522.000.
Dana Corporation: *See*—
Flotow, Richard A., 4,715,484, Cl. 192-70.250.
Danico, Henry F.; and Hammerle, Frederick A., to TRW Inc. Nut and washer assembly. 4,715,756, Cl. 411-369.000.
Daniel Industries, Inc.: *See*—
Allen, Charles R.; and Harshman, Jack D., 4,715,234, Cl. 73-861.910.
Daniel, Maurice. Light emitting optical fiber assemblies including light controlling. 4,715,700, Cl. 350-618.000.
Danilyak, Sergei N.: *See*—
Paton, Boris E.; Vasiliev, Vsevolod V.; Bogdanovsky, Valentin A.; Danilyak, Sergei N.; Gavva, Viktor M.; Roiko, Jury P.; and Nushko, Valery A., 4,716,273, Cl. 219-130.010.
Danner, Gary A.; and Sherman, Raymond W., to General Kinematics Corporation. Vibratory separation apparatus. 4,715,950, Cl. 209-20.000.
D'Antonio, Nicholas F.; and D'Antonio, Nicholas J., to Pfizer Hospital Products Group, Inc. Dry bottle drainage system. 4,715,855, Cl. 604-320.000.

D'Antonio, Nicholas J.: *See*—
D'Antonio, Nicholas F.; and D'Antonio, Nicholas J., 4,715,855, Cl. 604-320.000.
Darko Jorge Lazaneo Dragicevic: *See*—
De Angelis, Pedro C.; and Dragicevic, Nedo D. L., 4,715,458, Cl. 177-172.000.
D'Arrigo, Sebastiano; Imondi, Giuliano; and Vergara, Sossio, to Texas Instruments Incorporated. Power-up control circuit including a comparator, Schmitt trigger, and latch. 4,716,322, Cl. 307-592.000.
Datapoint Corporation: *See*—
Tompkins, E. Neil; and Bartholmae, Jack N., 4,716,585, Cl. 379-202.000.
Date, Takao; Okumura, Masaru; and Watanabe, Koya, to Toshiba Kikai Kabushiki Kaisha. Automatic pallet changer. 4,715,490, Cl. 198-346.100.
Daudelin, Douglas S., to AT&T Information Systems Inc. Adaptive FSK demodulator and threshold detector. 4,716,376, Cl. 329-107.000.
Davenport, William H.; McCormack, Gary D.; and LaRue, George S., to TriQuint. Direct coupled FET logic with super buffer output stage. 4,716,311, Cl. 307-448.000.
Daverveld, Leonardus A.: *See*—
Esser, Leonard J. M.; Van de Wiel, Petrus J. A. M.; Daverveld, Leonardus A.; and Van Gils, Johannes A. A., 4,716,446, Cl. 357-23.140.
Davies, Huw M.: *See*—
Thompson, Gregory A.; and Davies, Huw M., 4,716,101, Cl. 435-4.000.
Davies, Keith: *See*—
Collier, John C.; and Davies, Keith, 4,715,826, Cl. 439-438.000.
Davis, Gregory L.: *See*—
Curtis, Walter B.; Davis, Gregory L.; and Klimowicz, Mark C., 4,715,310, Cl. 114-220.000.
Davis, William F., to Motorola, Inc. Differential amplifier including balanced two terminal series RC network. 4,716,379, Cl. 330-252.000.
Day, Lawrence J.: *See*—
Flannagan, Stephen T.; Day, Lawrence J.; and Simon, Barry A., 4,716,302, Cl. 307-200.00B.
De La Huerga, Carlos: *See*—
Cudahy, Michael J.; De La Huerga, Carlos; Arneson, Harold N.; Divers, R. Thomas; and Altman, Barry J., 4,715,385, Cl. 128-710.000.
DeAngeles, John: *See*—
Saito, Yasunori; and DeAngeles, John, 4,715,677, Cl. 350-96.230.
De Angelis, Pedro C.; and Dragicevic, Nedo D. L., to Darko Jorge Lazaneo Dragicevic. Beam balance with unequal arms and didder device. 4,715,458, Cl. 177-172.000.
de Castiglione, Roberto: *See*—
Scarponi, Ugo; Lazzarini, Anna M.; Toti, Daniela; and de Castiglione, Roberto, 4,716,228, Cl. 540-578.000.
Deconinck, Filip: *See*—
Van Bogaert, Philippe; and Deconinck, Filip, 4,715,411, Cl. 139-452.000.
Deere & Company: *See*—
Kryscyk, Robert, 4,715,770, Cl. 414-680.000.
Oxley, Lonnie R., 4,715,168, Cl. 56-15.800.
Steilen, Ronald M., 4,715,515, Cl. 222-143.000.
Winter, David C.; and Wood, William R., 4,715,449, Cl. 172-513.000.
Wisdom, James N., 4,715,610, Cl. 280-490.00R.
Wohlford, William P.; and Hovenga, LaVern B., 4,716,401, Cl. 340-568.000.
Deflecta-Shield Corp.: *See*—
Butler L., Diego, 4,715,643, Cl. 296-97.00A.
DeGan, Allen D. Saw guide with cooling and lubricating capability. 4,715,254, Cl. 83-169.000.
DeGraffenreid, Howard T. Triangular filter cartridge and apparatus. 4,715,954, Cl. 210-323.100.
Degussa Aktiengesellschaft: *See*—
Drauz, Karlheinz; Kleemann, Axel; and Wolf-Heuss, Elisabeth, 4,716,237, Cl. 549-72.000.
Kleemann, Axel; Klenk, Herbert; and Schulz, Wolfgang, 4,716,247, Cl. 564-18.000.
de Jong, Feike; and Vermeule, Jacob, to Shell Oil Company. Lubricating oil compositions. 4,715,973, Cl. 252-40.500.
Delalande, Francois: *See*—
Bernard, Gilles; and Delalande, Francois, 4,715,118, Cl. 29-856.000.
della Valle, Francesco; and Romeo, Aurelio, to FIDIA, S.p.A. Method for preparing ganglioside derivatives and use thereof in pharmaceutical compositions. 4,716,223, Cl. 536-53.000.
De Luca, Paul V., to Porta Systems Corp. Wire strain relief and conductor retainer construction for telephone blocks. 4,715,830, Cl. 439-709.000.
Demaggio, Gregory: *See*—
Ovshinsky, Stanford R.; Hudgens, Stephen J.; Allred, David D.; and Demaggio, Gregory, 4,715,890, Cl. 75-0.5AA.
Ovshinsky, Stanford R.; Hudgens, Stephen J.; Allred, David D.; and DeMaggio, Gregory, 4,715,891, Cl. 75-0.5BA.
Demario, Edmund E.; Burman, Denis L.; Olson, Carl A.; and Secker, Jeffrey R., to Westinghouse Electric Corp. Universal fuel assembly construction for a nuclear reactor. 4,716,016, Cl. 376-446.000.
DeMars, Robert A. Glass having means for swizzle stick attachment. 4,715,505, Cl. 215-100.00R.
de Mello, Carol R.: *See*—
Markwell, Roger E.; Ward, Robert W.; and de Mello, Carol R., 4,716,160, Cl. 514-212.000.
Demmin, Gunter: *See*—
Hofmeister, Walter; and Demmin, Gunter, 4,715,925, Cl. 156-470.000.
Dempsey, Beth R. Carburetor for internal combustion engine. 4,715,346, Cl. 123-524.000.
Denick, John, Jr., to Warner-Lambert Company. Medicament adsorbates with surfactant and their preparation. 4,716,033, Cl. 424-48.000.
Denison, William J.; Smith, Lancing G.; and Walker, Lonnie R., to Halliburton Company. Grid system. 4,715,308, Cl. 114-72.000.
Denton Vacuum Inc: *See*—
Lee, Kon J.; and Musset, Anthony, 4,716,340, Cl. 315-111.410.
Depew, Donald R.; Houghton, Robert A.; and Sparks, David C., to Sparton Corporation. Tapered wiring harness. 4,716,554, Cl. 367-20.000.
Depew, Thomas N. Pallet construction. 4,715,294, Cl. 108-51.100.
Desfontaines, Guy: *See*—
Leroy, Claude; Millot, Jean-Paul; and Desfontaines, Guy, 4,716,008, Cl. 376-237.000.
De Simone, Luigi: *See*—
Pahl, Scott; and De Simone, Luigi, 4,716,504, Cl. 362-150.000.
DeSoto, Inc.: *See*—
Schmid, Steven R.; Ansel, Robert E.; and Murray, Kevin P., 4,716,209, Cl. 526-261.000.
Desvard, Catherine: *See*—
Pean, Jean-Louis; Desvard, Catherine; and Barbier, Jean-Paul, 4,715,985, Cl. 252-305.000.
Deters, Joseph C.: *See*—
Eckenhoff, James B.; Theeuwes, Felix; and Deters, Joseph C., 4,716,031, Cl. 424-453.000.
Detty, Garnett E. Knee brace with extension angle establishing means. 4,715,363, Cl. 128-80.00C.
Dickakian, Ghazi, to Du Pont de Nemours, E. I., and Company. Aromatic pitch. 4,715,945, Cl. 208-40.000.
Dicke, Hans-Rudolf: *See*—
Wagner, Rudolf; Halcour, Kurt; Dicke, Hans-Rudolf; and Eckhardt, Volker, 4,716,252, Cl. 568-729.000.
Dickinson, Ben W. O., III: *See*—
Cummings, Richard E.; Mackey, Charles S.; Dickinson, Robert W.; Dickinson, Ben W. O., III; and Larsen, Merle D., 4,715,128, Cl. 33-544.000.
Dickinson, Harry D. Manually depressible automatically deployable spring balanced bollard. 4,715,742, Cl. 404-6.000.
Dickinson III, Ben Wade Oakes: *See*—
Cummings, Richard E.; Mackey, Charles S.; Dickinson, Robert W.; Dickinson, Ben W. O., III; and Larsen, Merle D., 4,715,128, Cl. 33-544.000.
Dickinson, Robert W.: *See*—
Cummings, Richard E.; Mackey, Charles S.; Dickinson, Robert W.; Dickinson, Ben W. O., III; and Larsen, Merle D., 4,715,128, Cl. 33-544.000.
Dickinson, Robert Wayne: *See*—
Cummings, Richard E.; Mackey, Charles S.; Dickinson, Robert W.; Dickinson, Ben W. O., III; and Larsen, Merle D., 4,715,128, Cl. 33-544.000.
Diederen, Willi: *See*—
Heider, Joachim; Hauel, Norbert; Austel, Volkhard; Noll, Klaus; Bomhard, Andreas; van Meel, Jacques; and Diederen, Willi, 4,716,169, Cl. 514-299.000.
Diehl GmbH & Co.: *See*—
Holler, Roland, 4,715,285, Cl. 102-435.000.
Diel, Peter J.: *See*—
Lukaszczyk, Alfons; Martin, Henry; Diel, Peter J.; Fory, Werner; Gotzi, Karl; Kristinsson, Haukur; Muller, Beat; Muntwyler, Rene ; Pachlatko, Johannes P.; Rempfler, Hermann; Schurter, Rolf; and Szczepanski, Henry, 4,715,883, Cl. 71-90.000.
Diem, Bernard, to Commissariat a l'Energie Atomique. Process for producing by sloping etching a thin film transistor with a self-aligned gate with respect to the drain and source thereof. 4,715,930, Cl. 437-101.000.
Diesel Kiki Co., Ltd.: *See*—
Iijima, Takeo; Nomura, Hiroshi; Saito, Susumu; and Echizen, Susumu, 4,715,790, Cl. 417-269.000.
Mino, Kaoru; Fukushima, Koji; and Kasai, Takashi, 4,715,609, Cl. 277-207.00R.
Sugiura, Hiroyuki, 4,715,196, Cl. 62-468.000.
Dilling, Peter; and Schlegel, Susan L., to Westvaco Corporation. Lignosulfonate salts for use as dyestuff additives. 4,715,864, Cl. 8-557.000.
Dillon, Stephen M. Decorative lens. 4,715,702, Cl. 351-44.000.
Dinger, Horst; and Moosmann, Horst, to Gebruder Junghans GmbH. Impact switch for fuses. 4,715,281, Cl. 102-216.000.
Dislich, Helmut; Arfsten, Nanning J.; Schmidt, Helmut; Philipp, Gottfried; and Tuenker, Gerhard, to Schott Glaswerke. Process of making optical blanks. 4,715,999, Cl. 264-1.100.
Divers, R. Thomas: *See*—
Cudahy, Michael J.; De La Huerga, Carlos; Arneson, Harold N.; Divers, R. Thomas; and Altman, Barry J., 4,715,385, Cl. 128-710.000.
Diversey Wyandotte Corporation: *See*—
Lopes, John A.; and Stanton, James H., 4,715,980, Cl. 252-106.000.
Dixon International Limited: *See*—
Tanner, Robert A., 4,715,268, Cl. 98-41.100.
Dixon, Robert L.: *See*—
Costello, Rocky C.; and Dixon, Robert L., 4,715,300, Cl. 110-346.000.
Dobbs, Paul T. Map display. 4,715,642, Cl. 296-1.00R.

Dobreski, David V.: *See*—
Canterino, Peter J.; Dobreski, David V.; and Shaw, Richard G., 4,716,201, Cl. 525-240.000.
Dr. Karl Thomae GmbH: *See*—
Heider, Joachim; Hauel, Norbert; Austel, Volkhard; Noll, Klaus; Bomhard, Andreas; van Meel, Jacques; and Diederen, Willi, 4,716,169, Cl. 514-299.000.
Doddi, Namassivaya: *See*—
Dunks, Gary B.; Yamada, Akira; Beard, Charles D.; and Doddi, Namassivaya, 4,716,234, Cl. 548-259.000.
Dohi, Hideyuki: *See*—
Sato, Atsushi; Kawakami, Shigenobu; Endo, Keiji; and Dohi, Hideyuki, 4,716,084, Cl. 428-458.000.
Doi, Yuzuru, to Asahi Kogaku Kogyo Kabushiki Kaisha. Security device for detecting defects in transmitting fiber. 4,716,288, Cl. 250-227.000.
Domtar Inc.: *See*—
Fischer, David, 4,715,519, Cl. 225-48.000.
Dorner, Karl H.: *See*—
Asten, Wolfgang V.; Dorner, Karl H.; Scheel, Hartmut; and Wurstle, Volker, 4,715,903, Cl. 148-11.50A.
Dorr, John A., to Xecutek Corporation. Ultrasonic apparatus for determining the amount of liquid in a container of known volume. 4,715,226, Cl. 73-290.00V.
Dorsey, Eric A.: *See*—
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Evans, John C., 4,715,717, Cl. 356-429.000.
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Parker, Theodore L., 4,716,204, Cl. 525-504.000.
Rogers, Richard B.; and Herrero, Maria P., 4,716,174, Cl. 514-340.000.
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Altner, Ulrich; Falb, Wolfgang; Ryschka, Martin; and Wallroth, Carl-Friedrich, 4,715,370, Cl. 128-204.130.
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De Angelis, Pedro C.; and Dragicevic, Nedo D. L., 4,715,458, Cl. 177-172.000.
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Lavie, Louis F., 4,716,046, Cl. 426-96.000.
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Kempf, Richard J., 4,716,093, Cl. 430-277.000.
Klabunde, Ulrich, 4,716,205, Cl. 526-115.000.
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McConnell, Ronald F., 4,715,924, Cl. 156-433.000.
Mouissie, Bob; and Libregts, Hubertus B., 4,715,825, Cl. 439-391.000.
Randa, Stuart K., 4,716,073, Cl. 428-215.000.
Strauss, Howard W., 4,716,202, Cl. 525-370.000.
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Weed, Gregory C., 4,716,097, Cl. 430-327.000.
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Rodder, Karl-Martin, 4,716,051, Cl. 427-136.000.
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Karanewsky, Donald S.; and Petrillo, Edward W., Jr., 4,716,155, Cl. 514-89.000.
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Shank, Gordon W.; and Eason, Earl P., 4,716,345, Cl. 315-392.000.
East/West Industries, Inc.: *See*—
Spinosa, Dominic J.; and Knoll, Frank, 4,715,561, Cl. 244-129.100.
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Vanier, Noel R.; Lum, Kin K.; and Bowman, Wayne A., 4,716,144, Cl. 503-227.000.
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Bernstrom, Marvin L., 4,715,798, Cl. 418-57.000.
Buente, Stephen M.; and Hillebrand, George A., 4,715,334, Cl. 123-90.580.
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Eccles, Edward S.: *See*—
Saunders, Arthur F.; and Eccles, Edward S., 4,716,531, Cl. 364-431.020.
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Eckenhoff, James B.; Theeuwes, Felix; and Deters, Joseph C., to ALZA Corporation. Drug dispenser comprising a multiplicity of members acting together for successfully dispensing drug. 4,716,031, Cl. 424-453.000.

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Eggermont, Marc: *See*—
Tack, Rufin; and Eggermont, Marc, 4,715,556, Cl. 242-118.600.

Eggert, Walter S., Jr.: *See*—
Pavlick, Michael J.; McQueston, James C.; Eggert, Walter S., Jr.; and Sherrow, Lionel, 4,715,292, Cl. 105-456.000.

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Ehman, Richard L.; and Felmlee, Joel P., to General Electric Company. Method for reducing artifacts in NMR images. 4,715,383, Cl. 128-653.000.

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Ehrreich, John E., to Ercon, Inc. Conductive compositions and conductive powders for use therein. 4,716,081, Cl. 428-403.000.

Eichen, Erwin; and Flasck, James D., to Ovonic Synthetic Materials Company. Disordered coating. 4,716,083, Cl. 428-457.000.

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Ehrler, Ernst; Eichlseder, Martin; and Theiss, Edmund, 4,715,806, Cl. 425-553.000.

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Eiken Kagaku Kabushiki Kaisha: *See*—
Wada, Hiroshi; and Kosaka, Yuzo, 4,716,110, Cl. 435-25.000.

Eisenlohr, Franz. Gauze or leno harness for weaving machines. 4,715,408, Cl. 139-54.000.

Eitel, Frederick G., to United States of America, Army. Beam steering mirror construction. 4,715,694, Cl. 350-486.000.

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Elan Corporation P.L.C.: *See*—
Panoz, Donald E., 4,716,040, Cl. 424-459.000.

Elderton, John, to AE PLC. High inertia load drives and controls therefor. 4,715,491, Cl. 198-856.000.

Eldridge, Lawrence B.: *See*—
Grims, Conrad M.; and Eldridge, Lawrence B., 4,715,221, Cl. 73-149.000.

Electro-Voice Inc.: *See*—
Engelmann, Rudolph H., 4,716,353, Cl. 320-21.000.

Elektroschmelzwerk Kempten GmbH: *See*—
von Matuschka, Alfred G.; Liethschmidt, Klaus; Webert, Hubertus; and Kohler, Emil K., 4,715,812, Cl. 432-258.000.

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Ternansky, Robert J., 4,716,232, Cl. 548-112.000.

Elliott, Donald P.; and Halseth, William L., to C. R. Bard, Inc. Air leak detection system for chest fluid collection bottles and blow-out prevention baffle therefor. 4,715,856, Cl. 604-321.000.

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Hoshisi, Atsushi; and Endo, Hiroyuki, 4,715,257, Cl. 84-1.010.

Endo, Hisashi, to Yokogawa Medical Systems, Limited. Method of and apparatus for photographing medical image. 4,716,426, Cl. 354-76.000.

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Sato, Atsushi; Kawakami, Shigenobu; Endo, Keiji; and Dohi, Hideyuki, 4,716,084, Cl. 428-458.000.

Energy Conversion Devices, Inc.: *See*—
Johncock, Annette G.; and Hudgens, Stephen J., 4,715,927, Cl. 156-606.000.
Reichman, Benjamin; Venkatesan, Srini; Fetcenko, Michael A.; Jeffries, Kenneth; Stahl, Sharon; and Bennett, Clifford, 4,716,088, Cl. 429-101.000.
Yaniv, Zvi; Canella, Vincent D.; Chapelle, Walter E.; and Pryor, Roger W., 4,715,685, Cl. 350-332.000.

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Christner, Larry G.; and Koehler, Steven A., 4,716,023, Cl. 422-149.000.

Engel, Jurgen; Kleemann, Axel; Niemeyer, Ulf; Hilgard, Peter; and Pohl, Joerg, to Asta-Werke Aktiengesellschaft Chemische Fabrik. Salts of oxazaphosphorine derivatives. 4,716,242, Cl. 558-81.000.

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Blair, Boyton T., 4,715,971, Cl. 252-8.510.

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Bonelli, Fabio; Pessi, Antonello; and Verdini, Antonio S., 4,716,149, Cl. 514-13.000.

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Bonelli, Fabio; Pessi, Antonello; and Verdini, Antonio S., 4,716,149, Cl. 514-13.000.

Enkegaard, Torben, to F. L. Smidth & Co. A/S. Method and cooler for cooling granular material. 4,715,188, Cl. 62-63.000.

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Epper, Wolfgang: *See*—
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Epps, Joyce E.; Ng, Kung-Tat; Tuman, Robert W.; and Wu, Wu-Nan, to McNeilab, Inc. Hypoglycemic method using 5-substituted pyrrolidinylidene compounds. 4,716,163, Cl. 514-237.000.

Erber, Gunther. Roller shutter with jalousie-type louvers. 4,715,421, Cl. 160-133.000.

Ercon, Inc.: *See*—
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Erdman, Constance E.; and Padden, Timothy J., to S. C. Johnson & Son, Inc. Method of eliminating the corrosivity of hair conditioning compositions. 4,716,037, Cl. 424-70.000.

Erich, Richard R., to Bethel, George F.; and Bethel, Patience K., a part interest. Pumping device. 4,715,240, Cl. 74-52.000.

Erickson, Donald C. Retrofittable argon recovery improvement to air separation. 4,715,874, Cl. 62-22.000.

Erico International Corporation: *See*—
Carraro, Eugene; and Laughlin, Raymond S., 4,715,161, Cl. 52-714.000.

Ericsson, Sylve J. D., to Svecia Silkscreen Maskiner AB. Squeegee arrangement for silkscreen printers. 4,715,278, Cl. 101-123.000.

Ermel, Bernard A.: *See*—
Lanigan, John J., Sr.; Glickman, Myron; George, Thazhuthekudiyil V.; and Ermel, Bernard A., 4,715,762, Cl. 414-126.000.

Erni, Markus; and Salvisberg, Kurt, to Maschinen Abrik Rieter AG. Method and apparatus for controlling the effective length of thread packages. 4,715,550, Cl. 242-39.000.

Ernst, Hansgeorg; Littmann, Wolfgang; and Paust, Joachim, to BASF Aktiengesellschaft. α-(o-chlorophenyl)-aminomethylene-β-formylaminopropionitrile. 4,716,243, Cl. 558-395.000.

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ESCO Corporation: *See*—
Churchill, Robin K., 4,715,908, Cl. 148-327.000.

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Esser, Leonard J. M.; Van de Wiel, Petrus J. A. M.; Daverveld, Leonardus A.; and Van Gils, Johannes A. A., to U.S. Philips Corporation. Insulated dual gate field effect transistor. 4,716,446, Cl. 357-23.140.

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Lavallee, Francois A., 4,716,190, Cl. 524-386.000.

Essig, Willi; Kicherer, Robert; and Mayer, Hans, to EGO Elektro-Gerate Blanc u. Fischer. Fastening mechanism for mounting operating equipment and the like. 4,715,569, Cl. 248-27.100.

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Jarreau, Francois-Xavier; and Koenig, Jean-Jacques, 4,716,171, Cl. 514-305.000.

Ethyl Corporation: *See*—
Scymanski, Gerald L.; Mossaad, Amgad S.; and Hussain, Saadat, 4,716,251, Cl. 568-645.000.

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Hori, Ryoichi; Itoh, Kiyoo; and Etoh, Jun, 4,716,313, Cl. 307-475.000.

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Merrien, Pierre L.; and Merrien, Pierre A., 4,715,427, Cl. 164-456.000.

Etudes Techniques et Representations Industrielles E.T.R.I.: *See*—
Sobiepanek, Janusz; and Aboukrat, Simon, 4,716,486, Cl. 361-24.000.

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Evans, Brett A.: *See—*
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Evans, John C., to Dow Chemical Company, The. Method for monitoring surface texture and quality for moving transparent film bodies. 4,715,717, Cl. 356-429.000.

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Gaudreau, Laurent R., 4,716,003, Cl. 264-302.000.
Millay, Lawrence I.; and Bourgoine, Edward, 4,715,147, Cl. 51-165.710.

Exxon Production Research Company: *See—*
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Cozewith, Charles; Ju, Shiaw; and Verstrate, Gary W., 4,716,207, Cl. 526-169.200.
Jacobson, Allan J.; Ho, Teh C.; Chianelli, Russell R.; Steger, John J.; and Montagna, Angelo A., 4,716,139, Cl. 502-167.000.
Kitano, Kissho; Duvdevani, Ilan; and Schulz, Donald N., 4,715,865, Cl. 44-7.300.
Thompson, John A., 4,715,960, Cl. 210-651.000.

Ezekoye, L. Ike; Rusnica, Edward J.; and Sepp, Henry A., Jr., to Westinghouse Electric Corp. Forming a seal between planar sealing surfaces. 4,716,005, Cl. 376-205.000.

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F. L. Smidth & Co. A/S: *See—*
Enkegaard, Torben, 4,715,188, Cl. 62-63.000.
Folsberg, Jan, 4,715,544, Cl. 241-57.000.

Facet Enterprises, Inc.: *See—*
Giometti, Paul F., 4,715,239, Cl. 74-6.000.

Fair, Kenneth E.; and Campbell, Charles M., to Ampex Corporation. Single piece tape reel and assembly. 4,715,558, Cl. 242-199.000.

Fakirov, Stoyko C.; and Schultz, Jerold M., to University of Delaware. Interfacial bonding of polymeric laminae in the solid state. 4,715,919, Cl. 156-307.300.

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Altner, Ulrich; Falb, Wolfgang; Ryschka, Martin; and Wallroth, Carl-Friedrich, 4,715,370, Cl. 128-204.130.

Falgout, Thomas E., Sr.; and Schoeffler, William N., to Team Engineering and Manufacturing, Inc. Line wrap power tongs. 4,715,253, Cl. 81-57.140.

Falgout, Thomas E., Sr.; and Schoeffler, William N., to Team Construction and Fabrication, Inc. Drilling deviation control tool. 4,715,453, Cl. 175-73.000.

Fambrough, David G. Alternator and generator belt tensioning device. 4,715,844, Cl. 474-130.000.

Fancher, Llewellyn W., to Stauffer Chemical Co. Phosphonodithioylacetyl phenyl aminoacid ethyl esters. 4,716,156, Cl. 514-119.000.

Fang, Rong-Chin: *See—*
Angell, Eric H.; Aprille, Thomas J.; Azaret, Juan O.; Fang, Rong-Chin; Lee, Byeong G.; Longwell, Brian C.; Sharper, Craig A.; and Spalink, Jan-Dieter, 4,716,561, Cl. 370-55.000.

Fankhanel, Gerhard: *See—*
Drescher, Gunter; Fankhanel, Gerhard; and Gnirk, Wolfgang, 4,715,588, Cl. 267-122.000.

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Scarponi, Ugo; Lazzarini, Anna M.; Toti, Daniela; and de Castiglione, Roberto, 4,716,228, Cl. 540-578.000.

Farng, Liehpao O.; and Horodysky, Andrew G., to Mobil Oil Corporation. Copper salts of sulfurized fatty acids as antioxidants. 4,715,974, Cl. 252-46.400.

Farquharson, Graeme J.: *See—*
Conway, Richard J.; Watson, Keith G.; and Farquharson, Graeme J., 4,715,884, Cl. 71-90.000.

Farr, Glyn P. R., to Lucas Industries public limited Company. Hydraulic anti-skid braking systems for vehicles. 4,715,666, Cl. 303-116.000.

Farrell, Barbara L., to Xerox Corporation. High speed electronic reprographic/printing machine. 4,716,438, Cl. 355-6.000.

Fast, Jacob. Longitudinally reinforced display tag for product information. 4,715,135, Cl. 40-10.00R.

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Catena, Nicola, 4,715,288, Cl. 105-154.000.

Fathy, Ahmed M.: *See—*
Wallenfels, Kurt; and Fathy, Ahmed M., 4,716,222, Cl. 536-18.700.

Fattinger, Volker: *See—*
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Fazan, Bernard, to IRSID. Planetary-type rolling mill for non-flat products. 4,715,205, Cl. 72-198.000.

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Marzolph, Gerhard; Lunkenheimer, Winfried; and Fedtke, Carl, 4,715,888, Cl. 71-93.000.

Fee, Graham M., to Chemetron Railway Products, Inc. Rail fastening assemblies. 4,715,534, Cl. 238-349.000.

Felmlee, Joel P.: *See—*
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Fels, Christopher; and Fels, David. Alpine ski. 4,715,612, Cl. 280-609.000.

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Fenicle, Theodore W.: *See—*
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Fertil, Alain: *See—*
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Fest, Christa; Brandes, Wilhelm; Hanssler, Gerd; and Reinecke, Paul, to Bayer Aktiengesellschaft. Benzaldoxime carbamate derivatives, their compositions and method of use. 4,716,176, Cl. 514-477.000.

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Fetty, Walter; and Killian, Joseph R., to Killian Latex, Inc. Composition and method for the preservation of mastitis. 4,716,180, Cl. 514-782.000.

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Christ, Christy; Campbell, Herbert F.; Fields, Gayle P.; and Burris, James L., 4,716,075, Cl. 428-285.000.

Figgie International Inc.: *See—*
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Filtron Technology Corp.: *See—*
Friedman, Denis R., 4,715,955, Cl. 210-346.000.

Fine Lines International Ltd.: *See—*
Chappell, Richard L.; and Chappell, Alice M., 4,716,503, Cl. 362-97.000.

Finley, James J.: *See—*
Gillery, F. Howard; Criss, Russell C.; and Finley, James J., 4,716,086, Cl. 428-630.000.

Fischer, David, to Domtar Inc. Rolled dispenser for cutting a continuous rolled sheet and a blank therefor. 4,715,519, Cl. 225-48.000.

Fisher, Lynn E., to General Electric Company. Electric motor with adjustable switch location. 4,716,326, Cl. 310-89.000.

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Linden, Olavi, 4,715,122, Cl. 30-254.000.

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Fleming, Joseph A.; and Haider, Stephen J. Thermally actuated seat belt fastener. 4,715,096, Cl. 24-602.000.

Fleming, Roy E. Well cap. 4,715,439, Cl. 166-68.000.

Flo-Con Systems, Inc.: *See—*
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Florin Limited: *See—*
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Florio, Steven M., to Sprague Electric Company. Process for anodizing aluminum for an aluminum electrolytic capacitor. 4,715,936, Cl. 204-58.000.

Flotow, Richard A., to Dana Corporation. Automatic intermediate plate positioner. 4,715,484, Cl. 192-70.250.

Floyd, John F. Underwater viewing device. 4,715,837, Cl. 441-135.000.

FMC Corporation: *See*—
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Focke, Heinz; and Liedtke, Kurt, 4,715,497, Cl. 206-254.000.
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Focke, Heinz; and Focke, Jurgen, 4,715,847, Cl. 493-11.000.
Fodor, Amdras: *See*—
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Hendry, James D.; and Tobias, Lee A., 4,715,284, Cl. 102-434.000.
Ford, Allan L.; and Baronoff, Jay H., to Reborn Products Co., Inc. Novelty belt. 4,715,839, Cl. 446-28.000.
Ford Motor Company: *See*—
Cook, Jeffrey A.; and Hamburg, Douglas R., 4,715,340, Cl. 123-406.000.
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Foreman, Paul B.: *See*—
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Foret, Claude H. Dual pump for two separate fluids with means for heat exchange between the fluids. 4,715,435, Cl. 165-120.000.
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Forni, Luigi, to Pomini Farrel S.p.A. Rolling stand of the type with tie-rods with oscillating supports with interchangeable intermediate holder bases. 4,715,206, Cl. 72-237.000.
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Lukaszczyk, Alfons; Martin, Henry; Diel, Peter J.; Fory, Werner; Gotzi, Karl; Kristinsson, Haukur; Muller, Beat; Muntwyler, Rene ; Pachlatko, Johannes P.; Rempfler, Hermann; Schurter, Rolf; and Szczepanski, Henry, 4,715,883, Cl. 71-90.000.
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Fox, Clarence D., to Borg-Warner Corporation. Proportional solenoid valve. 4,715,396, Cl. 137-82.000.
Fox, Frank; and Leys, Cassius W. System for treating a surface. 4,716,056, Cl. 427-407.100.
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France, Howard G., to North American Philips Corporation. Reset mechanism responsive to loss of torque. 4,715,476, Cl. 185-40.00R.
Francis, Paul S. Modular personal security device. 4,716,402, Cl. 340-693.000.
Franklin, Randall M., to RVF Corporation. Automotive roll-up tool kit. 4,715,499, Cl. 206-373.000.
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Fritsch, Ronald J., to Eaton Corporation. Panel-mounted control station housing. 4,716,496, Cl. 361-391.000.
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Kiuchi, Takao, 4,716,474, Cl. 360-33.100.
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Fujimatsu, Masaaki; and Kobashi, Toshiyuki, to Japan Exlan Company Limited. Method of producing a flame-retardant acrylic copolymer. 4,716,002, Cl. 264-182.000.
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Fujioka, Futoshi; Boden, Richard M.; and Schreiber, William L., to International Flavors & Fragrances Inc. Process for augmenting or enhancing the aroma of detergents using mixtures of hydroxybornyloxybutanes. 4,715,981, Cl. 252-174.110.

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Fujisaki, Hisashi, to NEC Corporation. Noise-free terminal station compatible with existing master stations. 4,716,584, Cl. 379-176.000.

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Fujita, Kunihiro: *See*—
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Fujitsu Limited: *See*—
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Fukami, Harukazu; Kikumoto, Ryoji; Nakao, Kenichiro; Nitta, Issei; and Inoue, Shinya, to Mitsubishi Chemical Industries Limited. Phenylpiperazine derivatives and their acid addition salts. 4,716,161, Cl. 514-222.000.

Fukaya, Yasuhiro; and Minami, Nagio, to Mitsubishi Jukogyo Kabushiki Kaisha. Assembly of parts to be formed into a T-joint weld. 4,715,524, Cl. 228-165.000.

Fukui, Minoru; and Kataoka, Naoki, to Asahi Kasei Kogyo Kabushiki Kaisha. Deformation sensitive electroconductive knitted or woven fabric and deformation sensitive electroconductive device comprising the same. 4,715,235, Cl. 73-862.680.

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Fulkerson, David W.; and Smith, Lawrence W. Self-propelled percussion unit and method of using same. 4,715,471, Cl. 181-121.000.

Fuller, Christopher R. Apparatus and method for global noise reduction. 4,715,559, Cl. 244-1.00N.

Fuller Company: *See*—
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Fuller, Mark W.; and Robinson, Alan S., to Wet Enterprises, Inc. Method and apparatus for creating a kinetic water display. 4,715,136, Cl. 40-406.000.

Funabashi, Tsuneo; Iwasaki, Kazuhiko; and Nakamura, Hideo, to Hitachi, Ltd. Microcomputer system with buffer in peripheral storage control. 4,716,522, Cl. 364-200.000.

Funaki, Motokatsu. Roof structure and roof board therefor. 4,715,157, Cl. 52-529.000.

Furlenmeier, Andre, to Hoffmann-La Roche Inc. Process for manufacturing cephalosporin esters. 4,716,227, Cl. 540-230.000.

Furman, Lev B., to AMP Incorporated. Modular connector system. 4,715,827, Cl. 439-465.000.

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Gabuzda, Paul G.; and Terrell, Sanford V., to Unisys Corporation. Staggered radial-fin heat sink device for integrated circuit package. 4,715,438, Cl. 165-185.000.

Gaechter, Bernhard; Braunecker, Bernhard; and Muller, Fritz, to Wild Heerbrugg AG. Measuring device for determining relative position between two items. 4,715,714, Cl. 356-375.000.

Gagnon, Ralph J., to Hughes Aircraft Company. Optical system for three color liquid crystal light valve image projection system. 4,715,684, Cl. 350-331.00R.

Galgana, Russell J.; Mahoney, Patrick F.; and Sutin, Gordon L., to Smith & Mahoney, P.C. Dry ash removal system. 4,715,763, Cl. 414-216.000.

Gallo, Frank G.; Swenson, Clark E.; Bencloski, William A.; Cassette, Angelo J.; Manno, John L.; and Parlak, Edward A., to Westinghouse Electric Corp. Tooling apparatus for modifying nuclear reactors. 4,716,010, Cl. 376-260.000.

Gamarra, Jose P.; and Swinmurn, C. John, to Raychem Corp. Styrene-diene block copolymer compositions. 4,716,183, Cl. 522-80.000.

Gant, Lawrence A. Manual differential lock-up. 4,715,248, Cl. 74-710.500.

Garblik, Alvin. Plasterboard repair kit. 4,715,151, Cl. 52-2.000.

Gardner, John F.; and Showalter, Thomas W., to Xomox Corporation. Valve and method of making same. 4,715,400, Cl. 137-341.000.

Gardner, Loren D.: *See*—
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Gasparro, Michael R.; and Tome, Richard E., to Westinghouse Electric Corp. Reactor internals loose parts strainer. 4,716,012, Cl. 376-352.000.

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Gaudreau, Laurent R., to Ex-Cell-O Corporation. Apparatus and method for reducing neck waste in a cast vinyl shell. 4,716,003, Cl. 264-302.000.

Gaughan, Roger G., to Phillips Petroleum Company. Preparation of a high molecular weight poly(arylene sulfide ketone). 4,716,212, Cl. 528-226.000.

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Gavva, Viktor M.: *See*—
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Gawronski, Michael J.; and Lamberg, John R., to Honeywell Inc. Millimeter wave microstrip surface mounted attenuator. 4,716,389, Cl. 333-81.00A.

Gaymans, Reinoud J.; and Bongers, Antonius J. P. Process for the preparation of polytetramethylene adipamide. 4,716,214, Cl. 528-335.000.

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GEC Avionics Limited: *See*—
Ellis, Stafford M., 4,716,498, Cl. 361-386.000.

Gehring, Manfred; and Pluss, Heinz, to Mage AG. Clamping sleeve with a clamping screw. 4,715,626, Cl. 285-230.000.

Geisser, Peter; Kaiser, Hans P.; and Berger, Franz, to Laboratorien Hausmann AG. Means for handling two solutions which are to be mixed together. 4,715,851, Cl. 604-82.000.

Geldmacher, Horst: *See*—
Langhoff, Josef; Krischke, Hermann; Geldmacher, Horst; Golomb, Manfred; Kamp, Karl-Heinz; Masuch, Peter; and Chalupnik, Rolf, 4,715,809, Cl. 431-170.000.

Genba, Yasusi: *See*—
Fujii, Hiroshi; Iio, Tsukasa; Genba, Yasusi; Moriwaki, Hideaki; and Mochizuki, Yoshinori, 4,716,265, Cl. 200-144.00R.

Gendreau, Paul M.: *See*—
Llort, Francisco M.; Gendreau, Paul M.; and Berard, Raymond A., 4,715,607, Cl. 273-218.000.

General Dynamics, Pomona Division: *See*—
MacNeil, Douglas E., 4,715,526, Cl. 228-219.000.

General Electric Company: *See*—
Ehman, Richard L.; and Felmlee, Joel P., 4,715,383, Cl. 128-653.000.
Fisher, Lynn E., 4,716,326, Cl. 310-89.000.
Kim, Bang M., 4,716,072, Cl. 428-212.000.
McGreehan, William F.; and Sherwood, Laurence T., 4,715,213, Cl. 73-40.700.
Parker, Preston K.; and Toutant, Roy T., 4,715,286, Cl. 104-88.000.
Pribis, Paul B.; and West, Herbert J., 4,715,260, Cl. 89-7.000.
Roussin, Alfred G., 4,716,339, Cl. 315-15.000.
Shah, Manoj R.; and Lenz, Henry G., 4,716,328, Cl. 310-178.000.
Takekoshi, Tohru; and Anderson, Patricia P., 4,716,216, Cl. 528-352.000.
Taub, Alan I.; and Frischmann, Peter G., 4,715,906, Cl. 148-120.000.
van der Meer, Roelof, 4,716,199, Cl. 525-92.000.
Wattley, Mark D., 4,715,197, Cl. 62-515.000.
Wills, Harry D.; and Betthauser, Joseph L., 4,716,297, Cl. 250-551.000.

Yerman, Alexander J.; and Loughran, James A., 4,716,124, Cl. 437-8.000.

General Kinematics Corporation: *See*—
Danner, Gary A.; and Sherman, Raymond W., 4,715,950, Cl. 209-20.000.

General Mills, Inc.: *See*—
Getman, Harlan R., 4,715,275, Cl. 99-494.000.

General Motors Corporation: *See*—
St. Angelo, Stephen; Carver, George C.; Patterson, David W.; and Fremont, Owen K., 4,715,110, Cl. 29-701.000.
Schubert, Peter J.; and Alvi, Nadeem S., 4,716,128, Cl. 437-41.000.

General Signal Corporation: *See*—
Maher, Joseph A.; Vowles, E. John; Napoli, Joseph D.; Zafiropoulo, Arthur W.; and Miller, Mark W., 4,715,921, Cl. 156-345.000.

Genter, Claude: *See*—
Arnoux, Daniel; Genter, Claude; Anton, Christian; and Forme, Jacques, 4,716,412, Cl. 340-753.000.

Geophysical Company of Norway A.S.: *See*—
Dragsund, Inge; and Gjestrum, Einar, 4,716,553, Cl. 367-15.000.

George, Peter T. Nocturnal airway-patency appliance. 4,715,368, Cl. 128-136.000.

George, Thazhuthekudiyil V.: *See*—
Lanigan, John J., Sr.; Glickman, Myron; George, Thazhuthekudiyil V.; and Ermel, Bernard A., 4,715,762, Cl. 414-126.000.

Georgetown University: *See*—
Ledley, Robert S.; and Gersten, Douglas M., 4,716,225, Cl. 536-122.000.

Gerlach, Charles R.: *See*—
Heath, Rodney T.; and Gerlach, Charles R., 4,715,808, Cl. 431-18.000.

Gero, Stephane; Cleophax, Jeanine; and Gateau-Olesker, Alice, to Roussel Uclaf. Optically active 4-carbalkoxy-2-azetidinones. 4,716,226, Cl. 540-200.000.

Gersten, Douglas M.: *See*—
Ledley, Robert S.; and Gersten, Douglas M., 4,716,225, Cl. 536-122.000.

Getman, Harlan R., to General Mills, Inc. Apparatus for producing frozen confections including edible particulate material. 4,715,275, Cl. 99-494.000.

Gewerkschaft Eisenhutte Westfalia GmbH: *See*—
Rassmann, Christoph; Nickel, Gerhard; Steinkuhl, Bernd; Merten, Gerhard; and Pfefferle, Egon, 4,715,659, Cl. 299-43.000.

Gidley, John L., to Exxon Production Research Company. Baffle system for conducting well treating operations. 4,715,443, Cl. 166-250.000.

Gilanyi, Robert A.; and Schmitt, Ralph H., to Concurrent Computer Corporation. Peripheral controller for coupling data buses having different protocol and transfer rates. 4,716,525, Cl. 364-200.000.

Gillery, F. Howard; Criss, Russell C.; and Finley, James J., to PPG Industries, Inc. Protective overcoat for low emissivity coated article. 4,716,086, Cl. 428-630.000.

Gillette, Rodney J.: *See*—
Bohl, Phillip B.; Gillette, Rodney J.; and Smith, James C., 4,715,337, Cl. 123-169.0PA.

Gilliland, Malcolm T. Distributed station welding system. 4,716,274, Cl. 219-130.210.

Giometti, Paul F., to Facet Enterprises, Inc. Engine starter gearing. 4,715,239, Cl. 74-6.000.

Gion, Hidenori; Yoda, Takumi; Kirita, Yasuzo; Zaima, Kazuhito; and Kurata, Noriyuki, to Kuraray Co., Ltd. Method for easily drawing blood from arm or leg. 4,715,849, Cl. 604-52.000.

Girard, Dennis: *See*—
Ahearn, John E.; Frates, Raymond A.; Girard, Dennis; Koepke, Richard A.; Schmidt, James K.; and Manon, C. Dodd, 4,716,082, Cl. 428-428.000.

Gjestrum, Einar: *See*—
Dragsund, Inge; and Gjestrum, Einar, 4,716,553, Cl. 367-15.000.

Glass, David W.; and Routt, Wilson M., Jr., to International Business Machines Corporation. Color variation in a passively illuminated display using fluorescent light sources. 4,715,687, Cl. 350-345.000.

Glass, Emmett F.; and Howell, Edmund O., to New Holland Inc. Reel lift mechanism for mower-conditioners. 4,715,171, Cl. 56-192.000.

Glassett, Kevin L., to Hewlett-Packard Company. Pen turret rotation for plotters. 4,716,420, Cl. 346-139.00R.

Gleason, Lawrence C. Miniature simulated baseball. 4,715,603, Cl. 273-90.000.

Glickman, Myron: *See*—
Lanigan, John J., Sr.; Glickman, Myron; George, Thazhuthekudiyil V.; and Ermel, Bernard A., 4,715,762, Cl. 414-126.000.

Glidden Company, The: *See*—
Berghoff, Wellington F., 4,716,200, Cl. 525-111.000.

Globus Fussstutzenfabrik Karl Kremendahl: *See*—
Kremendahl, Juergen, 4,715,131, Cl. 36-44.000.

Glover, Brian: *See*—
Harrison, David C.; and Glover, Brian, 4,715,414, Cl. 141-302.000.

Gnanamuthu, Daniel S.; Moores, Ralph J.; Paton, Neil E.; and Vyhna, Richard F., to Rockwell International Corporation. Non-contact scribing process for organic maskants on metals or alloys thereof. 4,716,270, Cl. 219-121.0LM.

Gnirk, Wolfgang: *See*—
Drescher, Gunter; Fankhanel, Gerhard; and Gnirk, Wolfgang, 4,715,588, Cl. 267-122.000.

Go-Jo Industries, Inc.: *See*—
Potter, Charles; Bell, Ronald F.; and Tosill, John M., 4,715,517, Cl. 222-181.000.

Goddard, Carl J., to Pfizer Inc. Chlorination of 2-methoxynicotinic acid. 4,716,231, Cl. 546-298.000.

Godlewski, Edward S. Stack-supporting bottom feed conveyor. 4,715,593, Cl. 271-10.000.

Goebel, Charles C.: *See*—
Schwarz, Alexander; Kalb, Charles E.; and Goebel, Charles C., 4,715,431, Cl. 105-110.000.

Goepel, Ernst; and Kusmierz, Hans, to Siemens Aktiengesellschaft. Mechanism for rinsing an ink printing head. 4,716,422, Cl. 346-140.00R.

Goffi, Carlo P.; and Clark-Goffi, Deborah E. Protective covering for lightweight vehicle. 4,715,646, Cl. 296-136.000.

Gold Star Co., Ltd.: *See*—
Kim, Eui D.; and Choi, Hyun J., 4,716,469, Cl. 358-245.000.

Goldstein, Yeshayahu S. A.; Tidman, Derek A.; Burton, Rodney L.; Massey, Dennis W.; and Winsor, Niels K., to GT-Devices. Cartridge containing plasma source for accelerating a projectile. 4,715,261, Cl. 89-8.000.

Goliarda Mugnai Trust: *See*—
Pera, Ivo, 4,716,024, Cl. 422-186.010.

Gollub, Hans J.; Hechenberger, Dieter A.; and Moermann, Renate, to Lingner & Fischer GmbH. Composition. 4,716,189, Cl. 524-284.000.

Golomb, Manfred: *See*—
Langhoff, Josef; Krischke, Hermann; Geldmacher, Horst; Golomb, Manfred; Kamp, Karl-Heinz; Masuch, Peter; and Chalupnik, Rolf, 4,715,809, Cl. 431-170.000.

Gomes, Rodney A.: *See*—
Stewart, Russell M.; and Gomes, Rodney A., 4,715,531, Cl. 229-73.000.

Gomez, Sergio V.: *See*—
Baucom, D. Michael; and Gomez, Sergio V., 4,716,534, Cl. 364-559.000.

Gonzalez, Carlos F.; and Gryczka, Alfred J., to Microlife Technics, Inc. Derived nisin producing microorganisms, method of production and use and products obtained thereby. 4,716,115, Cl. 435-172.300.

Goodman, Richard L.: *See*—
Roehr, William H., Jr.; and Goodman, Richard L., 4,715,520, Cl. 227-19.000.

Goodyear Tire & Rubber Company, The: *See*—
Fresch, Henry D.; and Hurt, Steven E., 4,715,107, Cl. 29-436.000.
Greenwood, Alan; and Majerus, Norbert, 4,715,577, Cl. 249-107.000.
Peterson, Paul J., 4,715,106, Cl. 29-426.400.

Gordon, Albert, to Cosmo Plastics Company. Bobbin device. 4,716,394, Cl. 336-192.000.

Gordon, Phillip J.: *See*—
Moutrie, Michael F.; Sokola, Raymond L.; and Gordon, Phillip J., 4,716,391, Cl. 333-206.000.

Gorski, Robert A.: *See*—
Connon, Helen A.; Gorski, Robert A.; Kenyon, William G.; and Yokozeki, Akimichi, 4,715,900, Cl. 134-31.000.

Gotaverken Arendal AB: *See*—
Liberg, Lars-Olof, 4,715,309, Cl. 114-125.000.

Gotoh, Toshihiko: *See*—
Morishita, Akira; Okamoto, Kyoithi; Gotoh, Toshihiko; Kako, Yukio; and Arima, Takemi, 4,715,243, Cl. 74-434.000.

Gotzi, Karl: *See*—
Lukaszczyk, Alfons; Martin, Henry; Diel, Peter J.; Fory, Werner; Gotzi, Karl; Kristinsson, Haukur; Muller, Beat; Muntwyler, Rene ; Pachlatko, Johannes P.; Rempfler, Hermann; Schurter, Rolf; and Szczepanski, Henry, 4,715,883, Cl. 71-90.000.

Gowans, Neil A.; and Riester, William C., to Trico Products Corporation. Windshield wiper blade assembly. 4,715,082, Cl. 15-250.420.

Graber, Gunter: *See*—
Hartjes, Rudolf; and Graber, Gunter, 4,715,133, Cl. 36-127.000.

Graciotti, Alessandro, to Ing. C. Olivetti. Bus converter. 4,716,527, Cl. 364-200.000.

Graf, Martin, to Grob & Co. Aktiengesellschaft. Device for coupling a heddle frame with a driving element. 4,715,409, Cl. 139-88.000.

Graham, Phyllis: *See*—
Calder, Oliver J., 4,715,537, Cl. 239-119.000.

Graham, Robert R.: *See*—
O'Donnell, Michael S.; and Graham, Robert R., 4,715,394, Cl. 137-38.000.

Granger, Douglas A., to Aluminum Company of America. Architectural product. 4,715,901, Cl. 148-2.000.

Grant Machinery Inc.: *See*—
Cantrell, Larry K.; and Smith, Edwin J., 4,715,596, Cl. 271-116.000.

Grau, Achim; and Niedermeier, Elmar, to Graul, Achim. Process and apparatus for vibratory operation of a working piston, in particular for active working tools. 4,715,265, Cl. 91-170.00R.

Graul, Achim: *See*—
Grau, Achim; and Niedermeier, Elmar, 4,715,265, Cl. 91-170.00R.

Gray, Bruce A.: *See*—
Ramsey, Everett M.; Gray, Bruce A.; and Evans, Donald C., 4,715,810, Cl. 432-8.000.

Green, Martin L.; Levy, Roland A.; and Nuzzo, Ralph G., to American Telephone and Telegraph Company, AT&T Bell Laboratories. Chemical vapor deposition of aluminum on an activated surface. 4,716,050, Cl. 427-99.000.

Greene, Orville T., Jr.; and Mead, John A. Flex couplings isolate stabilizing mirrors. 4,715,696, Cl. 350-500.000.

Greenwood, Alan; and Majerus, Norbert, to Goodyear Tire & Rubber Company, The. Apparatus for injection molding tire treads. 4,715,577, Cl. 249-107.000.

Gregory, Don A.; and Guenther, Bob D., to United States of America, Army. Modified liquid crystal television as a spatial light modulator. 4,715,683, Cl. 350-331.00R.

Greiner, Siegfried M.: *See*—
Fendley, James R.; and Greiner, Siegfried M., 4,716,334, Cl. 313-407.000.

Grenier, Daniel: *See*—
Altounian, George N.; and Grenier, Daniel, 4,716,213, Cl. 528-283.000.

Greve, Christopher G.: *See*—
Lapeyre, George C.; Greve, Christopher G.; and Ruys, Hendrik J., 4,715,093, Cl. 17-71.000.

Griffith, John D., to Sulzer Brothers Limited. Weaving loom. 4,715,410, Cl. 139-434.000.

Grigsby, Robert A., Jr., to Texaco, Inc. Reactive glass component in rim. 4,716,193, Cl. 524-730.000.

Grims, Conrad M.; and Eldridge, Lawrence B., to Adolph Coors Company. Mold cavity volume measuring apparatus. 4,715,221, Cl. 73-149.000.

Grob & Cc. Aktiengesellschaft: *See*—
Graf, Martin, 4,715,409, Cl. 139-88.000.

Groenenberg, Cornelis J.: *See*—
Couwenberg, Franciscus A. C. M.; Groenenberg, Cornelis J.; and Wetjens, Antonius C. S., 4,716,440, Cl. 355-14.0SH.

Grogler, Gerhard: *See*—
Hess, Heinrich; Grogler, Gerhard; and Kopp, Richard, 4,716,182, Cl. 521-163.000.

Grois, Igor: *See*—
Margolin, Mark; Grois, Igor; and Moore, James E., 4,715,251, Cl. 81-9.400.

Groner, Gabriel F.; Dorsey, Eric A.; Williams, Keith M.; and Vyas, Harihar J., to Speech Plus, Inc. Verbal computer terminal system. 4,716,583, Cl. 379-88.000.

Grosby, Lawton H., to Morley Furniture Spring Corporation. Sinuous band and seat spring assembly. 4,715,587, Cl. 267-103.000.

Gross, Robert L. Method for diagnosis of A.I.D.S. 4,716,107, Cl. 435-7.000.

Grossa, Mario, to Du Pont de Nemours, E. I., and Company. Method for reducing color cross-contamination during re-imaging of photo-tackifiable materials. 4,716,095, Cl. 430-291.000.

Groth, Rolf: *See*—
Schmitte, Franz-Josef; Muller, Dieter; and Groth, Rolf, 4,715,879, Cl. 65-60.200.

Grove, R. K.: *See*—
Jaekle, Don E., Jr.; and Grove, R. K., 4,715,399, Cl. 137-209.000.

Gruber, James R.; Gudath, Ernest A.; Michalski, Dennis H.; Riddle, Robert R.; and Stana, Regis R., to International Minerals & Chemical Corp. Defluorination kiln restriction control agent and method. 4,716,026, Cl. 423-167.000.

Grumet, Alex, to Grumman Aerospace Corporation. Aircraft skin antenna. 4,716,417, Cl. 343-708.000.

Grumman Aerospace Corporation: *See*—
Grumet, Alex, 4,716,417, Cl. 343-708.000.

Grundy Dispense Systems, Inc.: *See*—
Harrison, David C.; and Glover, Brian, 4,715,414, Cl. 141-302.000.

Gruning, Burghard; Holtschmidt, Ulrich; Koerner, Goetz; and Rossmy, Gerd, to Th. Goldschmidt AG. Particles, modified at their surface by hydrophilic and hydrophobic groups. 4,715,986, Cl. 252-315.200.

Gruppo Lepetit, S.p.A.: *See*—
Toja, Emilio, 4,716,159, Cl. 514-210.000.

Grutzner, Hans, to K. Bratschi, Silent Gliss. Tension fixture for a curtain. 4,715,583, Cl. 254-283.000.

Gryczka, Alfred J.: *See*—
Gonzalez, Carlos F.; and Gryczka, Alfred J., 4,716,115, Cl. 435-172.300.

GSE, Inc.: *See*—
Lehoczky, Ken, 4,715,211, Cl. 73-1.00C.

GT-Devices: *See*—
Goldstein, Yeshayahu S. A.; Tidman, Derek A.; Burton, Rodney L.; Massey, Dennis W.; and Winsor, Niels K., 4,715,261, Cl. 89-8.000.

GTE Communication Systems Corporation: *See*—
Mills, Jeffrey P.; and Macrander, Max S., 4,716,538, Cl. 364-754.000.
Mills, Jeffrey P.; and Macrander, Max S., 4,716,539, Cl. 364-754.000.

GTE Products Corporation: *See*—
Boudreau, Robert A., 4,715,940, Cl. 204-192.100.
Houck, David L.; Port, David J.; and Lee, Jen S., 4,716,019, Cl. 419-17.000.
Kopatz, Nelson E.; and Pruyne, Lori S., 4,715,878, Cl. 65-21.100.

Gudath, Ernest A.: *See*—
Gruber, James R.; Gudath, Ernest A.; Michalski, Dennis H.; Riddle, Robert R.; and Stana, Regis R., 4,716,026, Cl. 423-167.000.

Guenther, Bob D.: *See*—
Gregory, Don A.; and Guenther, Bob D., 4,715,683, Cl. 350-331.00R.

Guerrini, Giampaolo; and Caligaris Cappio, Emilio, to Ing. C. Olivetti & C., S.p.A. Obturator disc for an optical transducer. 4,716,289, Cl. 250-231.0SE.

Guffee, Larry E.: *See*—
Walker, Lonnie R.; Berryman, Leslie N.; Guffee, Larry E.; Ripley, David E.; and Prucha, David A., 4,715,721, Cl. 366-132.000.

Guilford, Richard P.; and Rosborough, John R., to United States of America, Energy. Monitoring transients in low inductance circuits. 4,716,364, Cl. 324-127.000.

Gunther, Seidl: *See*—
Johann, Merz; and Gunther, Seidl, 4,715,793, Cl. 417-300.000.

Gurega, Richard R., to Richal Corporation. Oil detection apparatus for submersible pumps. 4,715,785, Cl. 417-1.000.

Gusewell, Eike: *See*—
Schaible, Siegfried; Wolfle, Hans-Peter; Gusewell, Eike; and Kohl, Bernhard, 4,715,175, Cl. 56-432.000.

Gustafsson, Jukka: *See*—
Moisala, Tapio; and Gustafsson, Jukka, 4,715,877, Cl. 65-15.000.

Guthke, Hans-Peter: *See*—
Soltow, Uwe; Guthke, Hans-Peter; Plate, Hans-Georg; Lechner, Johann; and Kirma, Safa, 4,715,571, Cl. 248-68.100.

Guttinger, Heinrich, to BBC Brown, Boveri & Company, Ltd. Rotary-piston displacement machine. 4,715,797, Cl. 418-55.000.

H. Krantz GmbH & Co.: *See*—
Kehlenbach, Guenther, 4,715,199, Cl. 68-198.000.

H. Stoll GmbH & Co.: *See*—
Ploppa, Jurgen; and Schmid, Franz, 4,715,198, Cl. 66-75.200.

H. U. Ramseier: *See*—
Ramseier, Hans-Ulrich; and Brechbuhler, Fritz, 4,715,314, Cl. 118-631.000.

Haacke, E. Mark, to Picker International, Inc. Magnetic resonance reconstruction and scanning techniques using known information, constraints, and symmetry relations. 4,716,368, Cl. 324-309.000.

Haas, Hans, to Dragerwerk A.G. Lung-controlled diaphragm valve. 4,715,371, Cl. 128-204.260.

Haase, Franklin D.: *See*—
Westfall, Geoffrey J.; and Haase, Franklin D., 4,716,032, Cl. 424-45.000.

Haase, Gerald A. Vacuum cleaner attachment. 4,715,088, Cl. 15-415.00A.

Haba, Shinji, to Kabushiki Kaisha Tokai Rika Denki Seisakusho. Heater-equipped outer rearview mirror. 4,715,698, Cl. 350-588.000.

Habrich, Reiner; Bauer, Manfred; and Reiter, Alois, to Siemens Aktiengesellschaft. Metering pump. 4,715,795, Cl. 417-568.000.

Hach Company: *See*—
Andersen, Marinus L., 4,715,710, Cl. 356-246.000.

Hacker, David C., to Norand Corporation. Automatic voltage regulator means providing a dual low power responsive and output-voltage-controlling regulator signal particularly for a plural source battery powered system. 4,716,354, Cl. 320-39.000.

Hackmann, Ludger, to Bramlage Gesellschaft mit beschrankter Haftung. Shoe polish can. 4,715,496, Cl. 206-229.000.

Haderle, Donald J.: *See*—
Crus, Richard A.; Haderle, Donald J.; and Herron, Howard W., 4,716,528, Cl. 364-300.000.

Haganuma, Tomoyuki: *See*—
Ogawa, Toshiya; Ueno, Hiroaki; Yamada, Toshiaki; and Haganuma, Tomoyuki, 4,716,543, Cl. 364-900.000.

Hagen, Helmut; Kohler, Rolf-Dieter; Markert, Jurgen; and Wuerzer, Bruno, to BASF Aktiengesellschaft. Quinoline derivatives and their use for controlling undesirable plant growth. 4,715,889, Cl. 71-94.000.

Haider, Stephen J.: *See*—
Fleming, Joseph A.; and Haider, Stephen J., 4,715,096, Cl. 24-602.000.

Haile, Ernest. Drunk driver detection system. 4,716,413, Cl. 340-933.000.

Hako Minuteman, Inc.: *See*—
Todd, Mike J.; and Palmer, Gary E., 4,715,087, Cl. 15-385.000.

Halbach & Braun Industrieanlagen: *See*—
Braun, Gert; and Braun, Ernst, 4,715,658, Cl. 299-34.000.

Halcour, Kurt: *See*—
Wagner, Rudolf; Halcour, Kurt; Dicke, Hans-Rudolf; and Eckhardt, Volker, 4,716,252, Cl. 568-729.000.

Hale Fire Pump Company: *See*—
Eberhardt, H. Alfred, 4,715,327, Cl. 123-41.150.

Hall, Kenneth W.: *See*—
Jaksa, Tibor S.; Norton, Richard F.; Hall, Kenneth W.; Butler, Stephen J.; Chicoine, Craig C.; and Bienz, Wilford L., 4,715,103, Cl. 29-156.40R.

Hallberg, Anders: *See*—
Kjelgaard, Tom; Hallberg, Anders; and Jacobsson, Kenth, 4,715,528, Cl. 229-123.100.

Haller, Siegmund: *See*—
Lotz, Werner; Fuchs, Karlheinz; and Haller, Siegmund, 4,715,861, Cl. 8-94.180.

Halliburton Company: *See*—
Denison, William J.; Smith, Lancing G.; and Walker, Lonnie R., 4,715,308, Cl. 114-72.000.
Walker, Lonnie R.; Berryman, Leslie N.; Guffee, Larry E.; Ripley, David E.; and Prucha, David A., 4,715,721, Cl. 366-132.000.

Hallissy, Robert P.; Isakov, Edmund; Stephenson, Earle W.; and Rowlett, Don C., to Kennametal Inc. Grader blade with casting/insert assembly on leading edge. 4,715,450, Cl. 172-701.300.

Halseth, William L.: *See*—
Elliott, Donald P.; and Halseth, William L., 4,715,856, Cl. 604-321.000.

Hamada, Ken; Wada, Masaru; and Itoh, Kunio, to Matsushita Electric Industrial Co., Ltd. A high-output semiconductor laser of dove tail groove type. 4,716,571, Cl. 372-48.000.

Hamada, Masataka: *See*—
Taniguchi, Nobuyuki; Ishida, Tokuji; Hamada, Masataka; Karasaki, Toshihiko; and Norita, Toshio, 4,716,434, Cl. 354-408.000.

Hamagaki, Takayasu: *See*—
Takeuchi, Masatoshi; and Hamagaki, Takayasu, 4,715,150, Cl. 51-395.000.

Hamburg, Douglas R.: *See*—
Cook, Jeffrey A.; and Hamburg, Douglas R., 4,715,340, Cl. 123-406.000.
Hamby, Bill L. Flexible printed circuits and methods of fabricating and forming plated thru-holes therein. 4,715,928, Cl. 156-630.000.
Hamilton, Robert W.: *See*—
Wallace, David R.; Rothschild, George E.; and Hamilton, Robert W., 4,715,074, Cl. 5-93.00R.
Hammarstedt, Curt, to Tour & Andersson AB. Radiator valve incorporating presetting means. 4,715,579, Cl. 251-121.000.
Hammerle, Frederick A.: *See*—
Danico, Henry F.; and Hammerle. Frederick A., 4,715,756, Cl. 411-369.000.
Hampton, Keith; and Schwank, Johannes, to Eaton Corporation. Method and apparatus for pretreatment of fuel by partial combustion with a composite catalyst. 4,715,347, Cl. 123-551.000.
Han, Doyoung; and Renaud, Merle A., to American Standard Inc. Control and method for modulating the capacity of a temperature conditioning system. 4,715,190, Cl. 62-201.000.
Hancock, William R.: *See*—
Benson, David J.; Brown, Carl H.; and Hancock, William R., 4,716,460, Cl. 358-140.000.
Hanifl, Paul H., to Sage Products, Inc. Sharps disposal system. 4,715,498, Cl. 206-366.000.
Hanifl, Paul H.; and Newton, John J., Jr., to Sage Products, Inc. Tissue grinding and transport system and method. 4,715,545, Cl. 241-169.100.
Hansa Metallwerke AG: *See*—
Kress, Hermann, 4,715,406, Cl. 137-625.170.
Hansen, Jens Peter S., to Jens Peter Hansen, Aarhus A/S. Process for making portioned cheese. 4,716,043, Cl. 426-35.000.
Hansen, Richard: *See*—
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Hanson, Charles B., to J. I. Case Company. Variable geometry mounting arrangement for backhoe assembly. 4,715,771, Cl. 414-688.000.
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Hargreaves, Rodney B.; McLoughlin, Bernard J.; and Mills, Stuart D., to Imperial Chemical Industries PLC. As-triazinones. 4,716,164, Cl. 514-242.000.
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Harms, Eugene H., to Henry Filters, Inc. Method for filtering contaminated liquids. 4,715,964, Cl. 210-783.000.
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Harrick, Nicolas J. Accessory for infrared emission spectroscopy. 4,716,293, Cl. 250-340.000.
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Harrington, Patrick W., to Florin Limited. Profile gauge. 4,715,124, Cl. 33-175.000.
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Harris, Donald L., to Telectronics N.V. Capped pacer neck containing a connector assembly. 4,715,380, Cl. 128-419.00P.
Harris, Eugene G., to National Distillers and Chemical Corporation. 4-alkylphenyl-2-alkoxyethyl ethers and fragrance compositions containing same. 4,716.146, Cl. 512-21.000.
Harris, Frank R.; and Laing, Gordon E., to Singer Company, The. Vacuum cleaner tool storage. 4,715,083, Cl. 15-323.000.
Harris, Garry L. Vehicle safety harness for pets. 4,715,618, Cl. 280-801.000.
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Hart, Edward F.; and McDonough, William, to Homestead Products, Inc. Electrical appliance control system. 4,716,409, Cl. 340-825.220.
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Hartjes, Rudolf; and Graber, Gunter. Golf shoe. 4,715,133, Cl. 36-127.000.
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Hartman, Daniel A.; and Foster, L. Dale, to Hill-Rom Company, Inc. Overbed table. 4,715,295, Cl. 108-93.000.
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Hattori, Yoshiyuki; Matsui, Kazuma; Imani, Yuichi; Kuno, Akira; Nagata, Tetsuya; Nakane, Koji; and Nomura, Ken, to Nippondenso Co., Ltd. Brake oil pressure control device. 4,715,663, Cl. 303-110.000.
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Eggimann, Bernhard; Hochuli, Erich; and Schacher, Aifred, 4,716,219, Cl. 530-413.000.
Furlenmeier, Andre, 4,716,227, Cl. 540-230.000.
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Hohenwarter, Gert K. G., to Hypres, Inc. Open cycle cooling of electrical circuits. 4,715,189, Cl. 62-64.000.
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Hart, Edward F.; and McDonough, William, 4,716,409, Cl. 340-825.220.
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Krambrock, Wolfgang; and Hoppe, Hans, 4,715,951, Cl. 209-138.000.
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Hoshiai, Atsushi; and Endo, Hiroyuki, to Roland Corp. Waveform generating device for electronic musical instruments. 4,715,257, Cl. 84-1.010.
Hoshizaki Electric Co., Ltd.: *See*—
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Iwasa, Yoshihiro; Masuda, Toru; and Shibano, Yasuji, 4,715,819, Cl. 439-31.000.
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Huang, Tien-Tsai. Pressure gauge. 4,715,222, Cl. 73-146.800.
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Hoffman, Ernest G.; and Neuroth, David H., 4,716,260, Cl. 174-102.00R.
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Johncock, Annette G.; and Hudgens, Stephen J., 4,715,927, Cl. 156-606.000.
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Hughes Aircraft Company: *See*—
Gagnon, Ralph J., 4,715,684, Cl. 350-331.00R.
O'Meara, Thomas R.; and Lind, Richard C., 4,715,689, Cl. 350-354.000.
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Berry, Joe R.; Langowski, Faustyn C.; Renfro, James G.; and Smith, Roger, Jr., 4,715,761, Cl. 414-22.000.
Smith, Sidney K., Jr., 4,715,445, Cl. 166-377.000.
Huiskes, Cornelis; and Schutten, Evert D., to U.S. Philips Corporation. Fluorescent lamp. 4,716,337, Cl. 313-487.000.
Hulsizer, Philip N.; and Dahl, John H., to Welding Services, Inc. Apparatus for positioning a tool with respect to a cylindrical work piece. 4,716,271, Cl. 219-125.110.
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Hung, Angelo C. J.; and Wang, Francia C., to Tektronix, Inc. Method for test generation. 4,716,564, Cl. 371-27.000.
Hung, Michael, to Utility Electronics Industries Co. Ltd. Coaxial, two-cylindered air compressor. 4,715,787, Cl. 417-63.000.
Hunger, Hans-Dieter; and Coutelle, Charles, to Akademie der Wissenschaften der DDR. Chemically active triazine support composition. 4,716,103, Cl. 435-5.000.
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Hurley, John L.; Puzo, Joseph D.; and Tingey, Rosa F., to Pall Corporation. Porous fibrous fluorocarbon structures. 4,716,074, Cl. 428-220.000.
Hurn, Richard L.; and Sell, Michael R., to Black & Decker, Inc. Charging base for a battery-powered appliance. 4,716,352, Cl. 320-2.000.
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Fresch, Henry D.; and Hurt, Steven E., 4,715,107, Cl. 29-436.000.
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Lynm, Dwo; Morrison, Carl C.; and Hutcherson, Ronald W., Sr., 4,715,389, Cl. 131-335.000.
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Ibiden Kabushiki Kaisha: *See*—
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Igarashi, Sadao, to Alps Electric Co., Ltd. Waveguide-microstrip line converter. 4,716,387, Cl. 333-26.000.
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Iijima, Takeo; Nomura, Hiroshi; Saito, Susumu; and Echizen, Susumu, to Diesel Kiki Co., Ltd. Compressor having pulsating reducing mechanism. 4,715,790, Cl. 417-269.000.
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Impink, Albert J., Jr., to Westinghouse Electric Corp. Spectral shift reactor control method. 4,716,006, Cl. 376-209.000.

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Ing. Alfred Schmidt GmbH: *See—*
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Ingenuity Unlimited, Inc.: *See—*
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Inomata, Masaichi: *See—*
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Le Page, Jean-Francois; Billon, Alain; Morel, Frederic; Renard, Pierre; Biedermann, Jean-Michel; Laborde, Michel; and Bousquet, Jacques, 4,715,946, Cl. 208-45.000.
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Interlego A.G.: *See—*
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Interlock Corporation: *See—*
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Beausoleil, William F.; and McManigal, David F., 4,716,546, Cl. 364-900.000.
Burrus, Gilbert S., Jr.; Cooper, Ronald J.; Marr, Michael R.; Pescatore, John C.; and Marsico, Mario A., 4,716,523, Cl. 364-200.000.
Crus, Richard A.; Haderle, Donald J.; and Herron, Howard W., 4,716,528, Cl. 364-300.000.
Glass, David W.; and Routt, Wilson M., Jr., 4,715,687, Cl. 350-345.000.
Jones, Carol R.; and Susko, Robin A., 4,715,941, Cl. 204-192.360.
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International Flavors & Fragrances Inc.: *See—*
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Gruber, James R.; Gudath, Ernest A.; Michalski, Dennis H.; Riddle, Robert R.; and Stana, Regis R., 4,716,026, Cl. 423-167.000.
Lu, Jing-Jong; and Wehrmeister, Herbert L., 4,716,233, Cl. 548-245.000.

International Standard Electric Corporation: *See—*
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International Texas Industries, Inc.: *See—*
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inTest Corporation: *See—*
Holt, Alyn R.; and Matthiessen, Robert E., 4,715,574, Cl. 248-297.100.

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IRSID: *See—*
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Ishida, Tokuji: *See—*
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Yamaguchi, Takashi; Ishiguchi, Isao; and Inoue, Takeshi, 4,716,134, Cl. 501-136.000.

Ishihara, Sadao: *See—*
Nakao, Hideo; Fujimoto, Koichi; Ishihara, Sadao; Sugawara, Shinichi; and Igarashi, Isamu, 4,716,158, Cl. 514-202.000.

Ishihara, Shunichi; Ohno, Shigeru; Kanai, Masahiro; Oda, Shunri; and Shimizu, Isamu, to Canon Kabushiki Kaisha. Process for forming deposited film. 4,716,048, Cl. 427-39.000.

Ishii, Hiroshi: *See—*
Kawamura, Yoshikazu; Hosokawa, Minoru; Okazaki, Sakiho; and Ishii, Hiroshi, 4,715,725, Cl. 368-157.000.

Ishii, Katsumi; Hirayama, Kanae; Matsuoka, Yoshio; and Takahashi, Kotei, to Nissan Motor Co., Ltd. Four wheel steer control system for four wheel drive vehicle, responsive to driving torque distribution. 4,715,466, Cl. 180-233.000.

Ishikawa, Masakazu: *See—*
Nakanishi, Nobuyasu; Ishikawa, Masakazu; Shirai, Akira; and Noguchi, Noboru, 4,715,664, Cl. 303-111.000.

Ishimaru, Hajime; Miyamoto, Masao; and Kemaki, Shojiro, to Seiko Instruments & Electronics Ltd. Coolant preservation container. 4,715,186, Cl. 62-45.000.

Ishioka, Hidenori: *See—*
Umemura, Hiroyuki; Matsuda, Kenji; Tezuda, Tomofumi; Isono, Kazuaki; Ishioka, Hidenori; Sugawara, Sakuo; and Hara, Masanori, 4,715,191, Cl. 62-208.000.

Ishizaki, Akira: *See—*
Akashi, Akira; Ohmura, Hiroshi; Ishizaki, Akira; Ohtaka, Keiji; and Suda, Yasuo, 4,716,282, Cl. 250-201.000.

Ishizuka, Hiroshi. Method for producing of polycrystalline silicon and apparatus thereof. 4,715,317, Cl. 118-719.000.

Isobe, Minoru; Koshida, Yoshinori; and Yuasa, Katunori, to Oki Electric Industry Co., Ltd. Face and back reversing mechanism. 4,715,594, Cl. 271-65.000.

Isono, Kazuaki: *See—*
Umemura, Hiroyuki; Matsuda, Kenji; Tezuda, Tomofumi; Isono, Kazuaki; Ishioka, Hidenori; Sugawara, Sakuo; and Hara, Masanori, 4,715,191, Cl. 62-208.000.

Isotronics, Inc.: *See—*
Ahearn, John E.; Frates, Raymond A.; Girard, Dennis; Koepke, Richard A.; Schmidt, James K.; and Manon, C. Dodd, 4,716,082, Cl. 428-428.000.

Ispra Fibroptics Industries Herzlia Ltd.: *See—*
Jacobson, Amnon, 4,715,875, Cl. 65-3.110.

Ito, Masahiro; Kobayashi, Masaharu; and Arai, Takao, to Hitachi, Ltd. Method of transmitting digital data in which error detection codes are dispersed using alternate delay times. 4,716,567, Cl. 371-40.000.

Ito, Takaaki; Mori, Eiji; Uranishi, Koji; Miyazaki, Shinji; and Sugimoto, Junichi, to Toyota Jidosha Kabushiki Kaisha; and Horie Metal Co., Ltd. Fuel filler conduit. 4,715,509, Cl. 220-86.00R.

Ito, Takashi; Matsuzawa, Shigemitsu; and Kato, Katsuaki, to Nippon Engelhard Ltd. Platinum-copper alloy electrocatalyst and acid-electrolyte fuel cell electrode using the same. 4,716,087, Cl. 429-40.000.

Ito, Tomotaka, to Mitsubishi Denki Kabushiki Kaisha. Base drive circuit in a transistor inverter. 4,716,513, Cl. 363-97.000.

Ito, Yasuro; Higuchi, Yoshiro; Shiki, Takeshi; Tsuji, Yukikazu; Tsuji, Masanori; and Hayakawa, Mitsutaka, to Yasuro Ito and Taisei Corporation. Method of preparing mortar or concrete. 4,715,719, Cl. 366-2.000.

Ito, Yuji, to Canon Kabushiki Kaisha. Particle analyzing apparatus with index projecting optical system for detecting a focusing state of the measuring system. 4,715,708, Cl. 356-72.000.

Itoh, Kiyoo: *See*—
Hori, Ryoichi; Itoh, Kiyoo; and Etoh, Jun, 4,716,313, Cl. 307-475.000.

Itoh, Kunio: *See*—
Hamada, Ken; Wada, Masaru; and Itoh, Kunio, 4,716,571, Cl. 372-48.000.

Itonaga, Makoto, to Victor Company of Japan, Ltd. Recording disc and method for fabricating same. 4,716,560, Cl. 369-275.000.

ITT Industries, Inc.: *See*—
Ostwald, Fritz, 4,715,665, Cl. 303-111.000.

Iwai, Kenji: *See*—
Makabe, Eiichi; Uesugi, Mitsuaki; Inomata, Masaichi; Maruyama, Kyusuke; Iwai, Kenji; and Sano, Kazuo, 4,716,459, Cl. 358-106.000.

Iwakawa, Tsunekiyo: *See*—
Oida, Osamu; and Iwakawa, Tsunekiyo, 4,716,341, Cl. 315-169.400.

Iwaoka, Hideto: *See*—
Inoue, Yuji; Iwaoka, Hideto; and Sugiyama, Tadashi, 4,716,370, Cl. 324-319.000.

Iwasa, Koji: *See*—
Harada, Takamasa; Tagushi, Masaaki; and Iwasa, Koji, 4,715,688, Cl. 350-350.00S.

Iwasa, Yoshihiro; Masuda, Toru; and Shibano, Yasuji, to Hosiden Electronics Co., Ltd. Connector for printed board connection. 4,715,819, Cl. 439-31.000.

Iwasaki, Kazuhiko: *See*—
Funabashi, Tsuneo; Iwasaki, Kazuhiko; and Nakamura, Hideo, 4,716,522, Cl. 364-200.000.

Iwase, Tetsuo: *See*—
Masuzawa, Sigeaki; Shibata, Shinya; Miyazaki, Hiroshi; and Iwase, Tetsuo, 4,716,591, Cl. 381-51.000.

Iwashita, Yukihiro; and Okumura, Hideaki, to Seiko Epson Corporation. Light-passive display device and method of manufacturing same. 4,715,686, Cl. 350-339.00R.

Iwata, Hiromitsu: *See*—
Tanaka, Hiroshi; Iwata, Hiromitsu; and Kakizaki, Yukio, 4,716,299, Cl. 250-571.000.

Iwata, Nobuyoshi: *See*—
Tomita, Kuniyuki; Shimoji, Yasuo; Kumakura, Seiji; Koike, Hiroyuki; Iwata, Nobuyoshi; and Morisawa, Yasuhiro, 4,716,162, Cl. 514-234.000.

Iwata, Shigemi, to Mitsubishi Denki Kabushiki Kaisha. Apparatus for controlling an elevator. 4,716,517, Cl. 364-148.000.

Izawa, Susumu: *See*—
Akiyama, Hiroyuki; Izawa, Susumu; Okabe, Shigeru; and Yamaguchi, Toru, 4,716,021, Cl. 422-135.000.

J. I. Case Company: *See*—
Hanson, Charles B., 4,715,771, Cl. 414-688.000.

J. L. Wickham Company, Inc., The: *See*—
Wickham, John L., 4,715,113, Cl. 29-792.000.

J. M. Voith GmbH: *See*—
Bronowski, Helmut; and Dahlke, Christian, 4,715,781, Cl. 415-219.00C.
Brosius, Klaus, 4,715,481, Cl. 188-291.000.

Jackson, Francis W. Multiple piston expansion chamber engine. 4,715,328, Cl. 123-52.00B.

Jackson, Mark F.; Lawruk, Stephen P.; Schlegel, Dallas E.; and Spong, Richard V., to AMP Incorporated. Pick-up head. 4,715,112, Cl. 29-739.000.

Jackson, Richard L.: *See*—
John, Ansel N.; and Jackson, Richard L., 4,715,123, Cl. 30-276.000.

Jacob, Gernot; and Radom, Leon, to Progress-Elektrogeraete Mauz & Pfeiffer GmbH & Co. Hand vacuum cleaner. 4,715,084, Cl. 15-328.000.

Jacobs, Gordon M. Multiple output allpass switched capacitor filters. 4,716,388, Cl. 333-173.000.

Jacobson, Allan J.; Ho, Teh C.; Chianelli, Russell R.; Steger, John J.; and Montagna, Angelo A., to Exxon Research and Engineering Company. Amorphous sulfide catalysts of trivalent chromium and promoter metals and method of making same. 4,716,139, Cl. 502-167.000.

Jacobson, Amnon, to Ispra Fibroptics Industries Herzlia Ltd. Manufacture of optical fibre preforms. 4,715,875, Cl. 65-3.110.

Jacobson, Milton D. Garment and liner combination. 4,715,068, Cl. 2-272.000.

Jacobsson, Kenth: *See*—
Kjelgaard, Tom; Hallberg, Anders; and Jacobsson, Kenth, 4,715,528, Cl. 229-123.100.

Jaekle, Don E., Jr.; and Grove, R. K. Liquid-propellant management system for rockets and space vehicles. 4,715,399, Cl. 137-209.000.

Jaksa, Tibor S.; Norton, Richard F.; Hall, Kenneth W.; Butler, Stephen J.; Chicoine, Craig C.; and Bienz, Wilford L., to Caterpillar Inc. Method of producing interference connection between a fluid line and a fluid injector. 4,715,103, Cl. 29-156.40R.

James, David R., to James Industries Limited. Toilet aids. 4,715,069, Cl. 4-254.000.

James Industries Limited: *See*—
James, David R., 4,715,069, Cl. 4-254.000.

Jan, Yih-Min: *See*—
Bseisu, Amjad A.; Jan, Yih-Min; and Schuh, Frank J., 4,715,451, Cl. 175-40.000.

Japan Electronic Control Systems, Co., Ltd.: *See*—
Tomisawa, Naoki, 4,715,344, Cl. 123-489.000.

Japan Exlan Company Limited: *See*—
Fujimatsu, Masaaki; and Kobashi, Toshiyuki, 4,716,002, Cl. 264-182.000.

Japan National Railway: *See*—
Okamoto, Isao; Hiraishi, Motomi; Takai, Hideo; Kasai, Kenjiro; and Terada, Katsuyuki, 4,715,289, Cl. 105-199.200.

Japan Styrene Paper Corp.: *See*—
Akiyama, Hiroyuki; Izawa, Susumu; Okabe, Shigeru; and Yamaguchi, Toru, 4,716,021, Cl. 422-135.000.

Japan Tobacco Inc.: *See*—
Miki, Hajime, 4,715,170, Cl. 56-27.500.

Jarreau, Francois-Xavier; and Koenig, Jean-Jacques, to Etablissements Nativelle S.A. Antiarrhythmic quinidine derivatives. 4,716,171, Cl. 514-305.000.

Jarrett, Peter K.: *See*—
Casey, Donald J.; Jarrett, Peter K.; and Rosati, Louis, 4,716,203, Cl. 525-408.000.

Jaynes, Mark S.: *See*—
Kahil, John E.; Jaynes, Mark S.; and Harrell, Kirby R., 4,715,442, Cl. 166-250.000.

Jeffries, Kenneth: *See*—
Reichman, Benjamin; Venkatesan, Srini; Fetcenko, Michael A.; Jeffries, Kenneth; Stahl, Sharon; and Bennett, Clifford, 4,716,088, Cl. 429-101.000.

Jenike & Johanson, Inc.: *See*—
Johanson, Jerry R., 4,715,212, Cl. 73-38.000.

Jens Peter Hansen, Aarhus A/S: *See*—
Hansen, Jens Peter S., 4,716,043, Cl. 426-35.000.

Jensen, Jens R.: *See*—
Kjornaes, Kim; Christensen, Finn N.; and Jensen, Jens R., 4,716,041, Cl. 424-468.000.

Jensen, Peter J.: *See*—
Podoll, Michael J.; and Jensen, Peter J., 4,715,750, Cl. 406-111.000.

Jiko, Hideyasu; and Hayashi, Tomoyuki, to Matsushita Electric Industrial Co., Ltd. Amplifier circuit. 4,716,378, Cl. 330-108.000.

JJD S.A.: *See*—
Juhan, Jaroslaw V. M., 4,715,660, Cl. 301-13.00R.

Jofemar, S.A.: *See*—
Vidondo, Felix G., 4,715,514, Cl. 221-258.000.

Johann, Merz; and Gunther, Seidl, to Zahnradfabrik Friedrichshafen, AG. Flow regulating rotary vane pump. 4,715,793, Cl. 417-300.000.

Johanson, Jerry R., to Jenike & Johanson, Inc. Bulk solids property tester. 4,715,212, Cl. 73-38.000.

Johanson, Robert H., to Whirlpool Corporation. Vacuum cleaner and method of dissipating electrostatic charge. 4,715,085, Cl. 15-339.000.

Johanson, Robert H.; Montgomery, Raymond M.; Herndon, Michael T.; and Peterson, Edward C., to Whirlpool Corporation. Vacuum cleaner and method of dissipating electrostatic charge through corona discharge. 4,715,086, Cl. 15-339.000.

Johansson, Arne; and Namensen, Erland, to A/S Nunc. Method for the production of a plastic container. 4,715,911, Cl. 156-69.000.

Johansson, Kjell. Method and means for keeping cattle in a stall barn. 4,715,322, Cl. 119-27.000.

Johansson, Rolf: *See*—
Blad, Per A.; and Johansson, Rolf, 4,716,272, Cl. 219-129.000.

John, Ansel N.; and Jackson, Richard L., to Jackson, Richard L. Rotary trimmer with self-contained collection means. 4,715,123, Cl. 30-276.000.

John Fluke Mfg. Co., Inc.: *See*—
Eccleston, Larry E.; and Emery, John C., 4,716,398, Cl. 340-347.0DA.
Sheffer, Tzafrir, 4,716,361, Cl. 324-60.00R.

John, Puthenpurackal K.; and Shoemaker, Arthur H., to Cambridge Instruments Inc. Microscope body system. 4,715,697, Cl. 350-502.000.

Johncock, Annette G.; and Hudgens, Stephen J., to Energy Conversion Devices, Inc. Improved method of making a photoconductive member. 4,715,927, Cl. 156-606.000.

Johnny Stopper Inc.: *See*—
Cherico, John R., 4,715,138, Cl. 40-591.000.

Johns, Robert H.; and Nauman, John D., to Allegheny Ludlum Corporation. Method and apparatus for direct casting of crystalline strip by radiant cooling. 4,715,428, Cl. 164-463.000.

Johnsen & Jorgensen Plastics Limited: *See*—
McLaren, Kevin W., 4,715,506, Cl. 215-252.000.

Johnson, Alfred H.: *See*—
Schulz, Dietmar; Pohl, Peter; and Johnson, Alfred H., 4,715,674, Cl. 350-96.210.

Johnson, David W. Interlocking joint wine rack. 4,715,503, Cl. 211-74.000.

Johnson, Kimball W. Quick response automatic fire sprinkler head. 4,715,447, Cl. 169-37.000.

Johnson, Mark W., to PPG Industries, Inc. Sulfonium resins useful as pigment grinding vehicles in cationic electrodeposition. 4,715,898, Cl. 106-308.00Q.

Johnson, Marvin M.; and Nowack, Gerhard P., to Phillips Petroleum Company. Hydrogenation of dienes. 4,716,256, Cl. 585-274.000.

Johnson, Oliver S.; and Powell, Robert J. W., to Telephone Cables Limited. Optical fibre cable. 4,715,678, Cl. 350-96.230.

Johnson, William M. Bicycle reflector for handlebar attachment. 4,715,681, Cl. 350-99.000.

Johnston, Wilbur D., Jr.; and Long, Judith A., to American Telephone and Telegraph Company, AT&T Bell Laboratories. MOCVD of semi-insulating indium phosphide based compositions. 4,716,130, Cl. 437-104.000.

Jolles, Pierre; Migliore-Samour, Daniele; and Parker, Fabienne, to Rhone-Poulenc Sante. Tripeptides and their use. 4,716,151, Cl. 514-18.000.

Jones, Carol R.; and Susko, Robin A., to International Business Machines Corporation. Surface modification of organic materials to improve adhesion. 4,715,941, Cl. 204-192.360.

Jones, Darlene N. Method of dewatering food items. 4,715,963, Cl. 210-781.000.

Jones, Richard E., III: *See—*
Mauldin, Donald M.; and Jones, Richard E., III, 4,715,361, Cl. 128-52.000.

Joosten, Henricus C. M., to U.S. Philips Corporation. Method of manufacturing a plug. 4,715,119, Cl. 29-858.000.

Jordan, Rodney B. Nail reserve indicator. 4,715,522, Cl. 227-156.000.

Ju, Shiaw: *See—*
Cozewith, Charles; Ju, Shiaw; and Verstrate, Gary W., 4,716,207, Cl. 526-169.200.

Jue, Clifford T.: *See—*
Wiens, John P.; and Jue, Clifford T., 4,716,480, Cl. 360-105.000.

Juhala, Roland E.: *See—*
Reynolds, Albert H., III; McDaniel, Ernie C.; and Juhala, Roland E., 4,715,707, Cl. 356-28.500.

Juhan, Jaroslaw V. M., to JJD S.A. Vehicle disc wheel with multipie tires on one rim. 4,715,660, Cl. 301-13.00R.

Juhasz, Laszlo; and McLeod, Angus L, to Charcoal Cloth Ltd. Wound dressings. 4,715,857, Cl. 604-359.000.

Jung, Guenter: *See—*
Mack, Gerhard; Mueller, Birgit; Jung, Guenter; and Frass, Werner, 4,716,098, Cl. 430-331.000.

Jurock, Volker: *See—*
Allan, Jonathan M.; Burton, Richard J.; and Jurock, Volker, 4,715,959, Cl. 210-637.000.

K. Bratschi, Silent Gliss: *See—*
Grutzner, Hans, 4,715,583, Cl. 254-283.000.

Kabe, Kazuyuki; and Morikawa, Tuneo, to Yokohama Rubber Co., Ltd., The. Pneumatic tire for passenger car. 4,715,420, Cl. 152-557.000.

Kabo, J. Michael: *See—*
Amstutz, Harlan C.; and Kabo, J. Michael, 4,715,860, Cl. 623-22.000.

Kabushiki Kaisha Advance Kaihatsu Kenkyujo: *See—*
Yanagida, Hiroaki; and Ogata, Tadashi, 4,715,944, Cl. 204-426.000.

Kabushiki Kaisha Daini Seikosha: *See—*
Tabata, Junichi, 4,715,384, Cl. 128-706.000.

Kabushiki Kaisha Fuji Tekkosho: *See—*
Matsumoto, Yukimichi, 4,715,552, Cl. 242-56.00A.

Kabushiki Kaisha Fujikoshi: *See—*
Kanayama, Hideaki, 4,715,772, Cl. 414-730.000.

Kabushiki Kaisha Kawakami Seisakusho: *See—*
Nasu, Nobuo, 4,715,805, Cl. 425-504.000.

Kabushiki Kaisha Kenwood: *See—*
Sakai, Shigeru; and Kudo, Kazunori, 4,716,576, Cl. 375-5.000.

Kabushiki Kaisha Kobe Seiko Sho: *See—*
Oshima, Hiroo, 4,715,209, Cl. 72-366.000.

Kabushiki Kaisha Meidensha: *See—*
Ogawa, Hiroshi; Miyazaki, Yasuyuki; Yoshida, Susumu; and Sasaki, Shinichi, 4,716,530, Cl. 364-424.000.

Kabushiki Kaisha Mitsui Miike Seisakusho: *See—*
Sato, Koji; Kuroda, Hiroshi; Yamada, Ryuji; and Serino, Mamoru, 4,715,657, Cl. 299-1.000.

Kabushiki Kaisha Nakajima Tekkosho: *See—*
Nakajima, Shigemi, 4,715,631, Cl. 294-2.000.

Kabushiki Kaisha Tokai Rika Denki Seisakusho: *See—*
Haba, Shinji, 4,715,698, Cl. 350-588.000.

Kabushiki Kaisha Toshiba: *See—*
Ando, Hideo, 4,716,283, Cl. 250-201.000.
Honda, Toshio; Ohhashi, Toshiro; and Ohtsubo, Yasuo, 4,715,247, Cl. 74-640.000.
Imamura, Kaoru; and Muramoto, Kenichi, 4,716,489, Cl. 361-91.000.
Ishigaki, Toshinori, 4,715,595, Cl. 271-110.000.
Koike, Hideharu, 4,716,318, Cl. 307-520.000.
Kondoh, Hitoshi; and Sueda, Akihiro, 4,716,452, Cl. 357-68.000.
Matsuo, Satoshi, 4,716,457, Cl. 358-98.000.
Matsuo, Yukito, 4,716,346, Cl. 318-38.000.
Mochizuki, Tohru, 4,716,548, Cl. 365-149.000.
Okazaki, Yoji, 4,716,419, Cl. 346-76.0PH.
Sato, Noriko; and Suzuki, Masayuki, 4,715,218, Cl. 73-86.000.
Takamura, Yoshio; and Nakajima, Akira, 4,716,512, Cl. 363-61.000.
Tokita, Kiyoshi; and Kondou, Masayoshi, 4,716,333, Cl. 313-402.000.
Wada, Tetsuro; and Ohkubo, Yasuo, 4,716,323, Cl. 307-594.000.
Yamaguchi, Noboru, 4,716,405, Cl. 340-723.000.
Yamazaki, Mutsuki, 4,716,089, Cl. 430-57.000.
Yamazaki, Mutsuki, 4,716,090, Cl. 430-65.000.

Kabushiki Kaisha Universal: *See—*
Okada, Kazuo, 4,715,604, Cl. 273-143.00R.

Kabushikigaisha Tokyo Kikai Seisakusho: *See—*
Hatakeyama, Tetsuo; Uera, Yoshinori; and Nagao, Nobuaki, 4,715,553, Cl. 242-68.400.

Kaempf, Karl; Zaehner, Paul; and Richter, Wolfgang, to Metrohm AG. Process and apparatus for quantitative and/or qualitative analysis of liquids. 4,715,237, Cl. 73-864.620.

Kagawa, Hirohiko; Kyotani, Yasuhiro; and Torii, Munetomo, to Matsushita Electric Works, Ltd. Epoxy resin encapsulating compoeition with enhanced moisture resistance and method for producing the same. 4,716,184, Cl. 523-310.000.

Kahil, John E.; Jaynes, Mark S.; and Harrell, Kirby R., to PA Incorporated. Apparatus for servicing tubular strings in subterranean wells. 4,715,442, Cl. 166-250.000.

Kai Cutlery Center Co., Ltd.: *See—*
Sugiyama, Makoto; Sugimura, Hiroshi; Machida, Naoyoshi; and Murai, Yoshiichi, 4,715,121, Cl. 30-253.000.

Kain, William S.: *See—*
Staker, Donald D.; and Kain, William S., 4,715,866, Cl. 44-51.000.

Kaiser, Bernhard; and Wokoeck, Ortwin, to Kienzle Apparate GmbH. Device for testing properties of coins. 4,715,223, Cl. 73-163.000.

Kaiser, Hans P.: *See—*
Geisser, Peter; Kaiser, Hans P.; and Berger, Franz, 4,715,851, Cl. 604-82.000.

Kaiser, Siegmund H.: *See—*
Lipinski, Reinhard; and Kaiser, Siegmund H., 4,715,241, Cl. 74-89.150.

Kakizaki, Yukio: *See—*
Tanaka, Hiroshi; Iwata, Hiromitsu; and Kakizaki, Yukio, 4,716,299, Cl. 250-571.000.

Kako, Yukio: *See—*
Morishita, Akira; Okamoto, Kyoithi; Gotoh, Toshihiko; Kako, Yukio; and Arima, Takemi, 4,715,243, Cl. 74-434.000.

Kaku, Shinkyo: *See—*
Menon, Vinod; and Kaku, Shinkyo, 4,716,467, Cl. 358-260.000.

Kalb, Charles E.: *See—*
Schwarz, Alexander; Kalb, Charles E.; and Goebel, Charles C., 4,715,431, Cl. 105-110.000.
Schwarz, Alexander; and Kalb, Charles E., 4,715,433, Cl. 165-110.000.

Kameda, Hiroshi, to Tokiwa Kogyo Co., Ltd. Film packaging apparatus. 4,715,166, Cl. 53-550.000.

Kamerer, Larry. Eyeglass holder. 4,715,575, Cl. 248-309.100.

Kameyama, Masaomi; and Matsumoto, Koichi, to Nippon Kogaku K.K. Photochemical reaction apparatus. 4,715,318, Cl. 118-722.000.

Kaminaka, Nobuyuki; and Yoshida, Yasuo, to Matsushita Electrical Industrial Co., Ltd. Magnetic head comprising a core formed of small and large thin film patterns. 4,716,484, Cl. 360-125.000.

Kamo, Yoshihisa: *See—*
Sato, Naoki; Kamo, Yoshihisa; Katoh, Yasuhiro; Kosuge, Minoru; and Arai, Shinichi, 4,716,306, Cl. 307-296.00R.

Kamp, Karl-Heinz: *See—*
Langhoff, Josef; Krischke, Hermann; Geldmacher, Horst; Golomb, Manfred; Kamp, Karl-Heinz; Masuch, Peter; and Chalupnik, Rolf, 4,715,809, Cl. 431-170.000.

Kan, Yoshiro, to Nippon Seiko Kabushiki Kaisha. Water pump. 4,715,780, Cl. 415-170.00A.

Kanai, Masahiro: *See—*
Ishihara, Shunichi; Ohno, Shigeru; Kanai, Masahiro; Oda, Shunri; and Shimizu, Isamu, 4,716,048, Cl. 427-39.000.

Kanayama, Hideaki, to Kabushiki Kaisha Fujikoshi; and Mazda Motor Corporation. Apparatus for automatic glazing of cars. 4,715,772, Cl. 414-730.000.

Kanegafuchi Kagaku Kogyo Kabushiki Kaisha: *See—*
Takahashi, Satomi; Inoue, Kenji; Yanagida, Yoshifumi; Ohashi, Takehisa; and Watanabe, Kiyoshi, 4,716,235, Cl. 548-533.000.

Kaneiwa, Shinji: *See—*
Yoshida, Toshihiko; Takiguchi, Haruhisa; Kaneiwa, Shinji; and Matsui, Sadayoshi, 4,716,570, Cl. 372-45.000.

KAO Corporation: *See—*
Kishine, Nobuyuki; Imamura, Tetsuya; and Yamauchi, Michihide, 4,716,078, Cl. 428-336.000.
Mishima, Masayuki, 4,715,961, Cl. 210-692.000.

Kaoru, Koide; and Sadao, Nagai, to Takamiya Dental Manufacturing Company Limited. Articulator. 4,715,814, Cl. 433-59.000.

Kapoor, Anoop; Choby, Edward J.; Kramer, Thomas J.; Ranieri, James E.; Roth, Charles H., Jr.; Scheffer, Donald E.; Spehar, John E., Jr.; Bessko, Csaba; and Blumstein, Robert M., to Westinghouse Electric Corp. Remote repair system for nuclear fuel rod assemblies. 4,715,111, Cl. 29-723.000.

Kapps, Manfred: *See—*
Mann, Max; and Kapps, Manfred, 4,715,746, Cl. 405-264.000.

Kapusciniski, Maria M.; Kaufman, Benjamin J.; and Liu, Christopher S., to Texaco Inc. Oil containing dispersant VII olefin copolymer. 4,715,975, Cl. 252-50.000.

Karanewsky, Donald S.; and Petrillo, Edward W., Jr., to E. R. Squibb & Sons, Inc. Phosphorus containing compounds and hypotensive use thereof. 4,716,155, Cl. 514-89.000.

Karasaki, Toshihiko: *See—*
Taniguchi, Nobuyuki; Ishida, Tokuji; Hamada, Masataka; Karasaki, Toshihiko; and Norita, Toshio, 4,716,434, Cl. 354-408.000.

Karl Mayer textilmaschirenfabrik: *See—*
Bogucki-Land, Bogdan, 4,715,097, Cl. 28-172.000.

Kasahara, Noboru: *See—*
Atsumi, Haruyuki; Anzai, Hisatugu; and Kasahara, Noboru, 4,715,146, Cl. 49-1.000.

Kasai, Kenjiro: *See—*
Okamoto, Isao; Hiraishi, Motomi; Takai, Hideo; Kasai, Kenjiro; and Terada, Katsuyuki, 4,715,289, Cl. 105-199.200.

Kasai, Kiyoshi; Tsukidate, Takaaki; and Arakawa, Toshihiko, to Toyo Soda Manufacturing Co., Ltd. Process for preparation of high-type silicon nitride powder. 4,716,028, Cl. 423-344.000.

Kasai, Takashi: *See*—
Mino, Kaoru; Fukushima, Koji; and Kasai, Takashi, 4,715,609, Cl. 277-207.00R.

Kashiwagi, Atsumi, to Fujimoto Photo Industrial Co., Ltd. Therapeutic tomographic system. 4,716,425, Cl. 354-76.000.

Kassing, Lothar: *See*—
Baumann, Karl-Heinz; Schick, Gerald; Kassing, Lothar; Bossenmaier, Alban; and Brambilla, Luigi, 4,715,468, Cl. 180-271.000.

Katada, Hiroshi: *See*—
Koike, Hiroshi; Katada, Hiroshi; and Yoneda, Hiroshi, 4,715,353, Cl. 123-590.000.

Katsoka, Naoki: *See*—
Fukui, Minoru; and Kataoka, Naoki, 4,715,235, Cl. 73-862.680.

Katayama, Akira: *See*—
Ozawa, Kunitaka; Nakamura, Takashi; Katayama, Akira; Hatanaka, Katsunori; Mori, Tetsuzo; and Takaoka, Makoto, 4,716,421, Cl. 346-140.00R.

Katayama, Kazuso; Ichiryu, Taku; Mitsuhashi, Tsuneyoshi; Mori, Yasushi; and Kobayashi, Masanori, to Mitsubishi Jukogyo Kabushiki Kaisha. Centrifugal compressor. 4,715,778, Cl. 415-104.000.

Katayama, Yoshitaka; Nabeshima, Daiki; and Nakamura, Shinichi, to Tokyo Shibaura Denki Kabushiki Kaisha. Record disc addressing apparatus. 4,716,558, Cl. 369-33.000.

Kato, Katsuaki: *See*—
Ito, Takashi; Matsuzawa, Shigemitsu; and Kato, Katsuaki, 4,716,087, Cl. 429-40.000.

Katoh, Yasuhiro: *See*—
Sato, Naoki; Kamo, Yoshihisa; Katoh, Yasuhiro; Kosuge, Minoru; and Arai, Shinichi, 4,716,306, Cl. 307-296.00R.

Katsaros, James. Locking device for a door lock. 4,715,200, Cl. 70-211.000.

Katsube, Teruaki: *See*—
Sata, Toshikatsu; Katsube, Teruaki; and Iida, Yoshiya, 4,715,691, Cl. 350-357.000.

Katsumata, Fujio: *See*—
Ezura, Toyokazu; Katsumata, Fujio; and Ikeya, Kiyokazu, 4,715,823, Cl. 439-267.000.

Katsumoto, Naoaki; and Miyagawa, Toshihito, to Shiroki Kinzoku Kogyo Kabushiki Kaisha; and Toyota Jidosha Kabushiki Kaisha. Reclining angle adjustment device. 4,715,655, Cl. 297-362.000.

Katsuoka, Norio: *See*—
Ikeda, Akitoshi; Nishimura, Chitoshi; Katsuoka, Norio; and Obara, Masami, 4,715,582, Cl. 254-134.3CL.

Katz, Yoram, to Imperial Private Power. Electrical or thermal tracking cogeneration system utilizing open cycle-air-conditioning. 4,715,192, Cl. 62-323.100.

Kaufman, Benjamin J.: *See*—
Kapusciniski, Maria M.; Kaufman, Benjamin J.; and Liu, Christopher S., 4,715,975, Cl. 252-50.000.

Kawaguchi, Takao; Adachi, Hideaki; Setsune, Kentaro; Ohji, Kenzo; and Wasa, Kiyotaka, to Matsushita Electric Industrial Co., Ltd. Optical switch. 4,715,680, Cl. 350-96.340.

Kawai, Joji: *See*—
Yoshida, Koichi; and Kawai, Joji, 4,716,535, Cl. 364-565.000.

Kawakami, Shigenobu: *See*—
Sato, Atsushi; Kawakami, Shigenobu; Endo, Keiji; and Dohi, Hideyuki, 4,716,084, Cl. 428-458.000.

Kawamori, Hideo: *See*—
Hayashi, Mamoru; and Kawamori, Hideo, 4,715,922, Cl. 156-361.000.

Kawamura, Masaharu; Harada, Yoshihito; Kobayashi, Ryuichi; Suzuki, Masayuki; Ohara, Tsunemasa; and Tosaka, Yoichi, to Canon Kabushiki Kaisha. Automatic film loading device for camera. 4,716,428, Cl. 354-173.110.

Kawamura, Yoshikazu; Hosokawa, Minoru; Okazaki, Sakiho; and Ishii, Hiroshi, to Seiko Epson Corporation. Step motor control mechanism for electronic timepiece. 4,715,725, Cl. 368-157.000.

Kawanabe, Tomohiko; Kushida, Noritaka; Asakura, Masahiko; and Seki, Yasunari, to Honda Giken Kogyo Kabushiki Kaisha. Air intake side secondary air supply system for an internal combustion engine with a duty ratio control operation. 4,715,350, Cl. 123-587.000.

Kawanabe, Tomohiko; Asakura, Masahiko; Kushida, Noritaka; and Kimura, Katsuhiko, to Honda Giken Kogyo Kabushiki Kaisha. Air intake side secondary air supply system for an internal combustion engine with a duty ratio control operation. 4,715,352, Cl. 123-589.000.

Kawasaki Jukogyo Kabushiki Kaisha: *See*—
Sagawa, Ryuichi; Nagata, Osamu; and Yamada, Hajime, 4,715,339, Cl. 123-357.000.

Kawasaki, Kiyohito; Sato, Michitaka; Koseki, Hiroyuki; and Matsunuma, Tamotsu, to Bridgestone Corporation. Large-size pneumatic radial tire for use on rough road with belt having specified cord. 4,715,419, Cl. 152-527.000.

Kawase, Yoshihiro: *See*—
Hosoe, Toshiaki; Ando, Seigo; and Kawase, Yoshihiro, 4,716,366, Cl. 324-207.000.

Kawata, Ken: *See*—
Yabuki, Yoshiharu; Sato, Kozo; Kawata, Ken; and Hirai, Hiroyuki, 4,716,100, Cl. 430-570.000.

Kawata, Toshihiko: *See*—
Numata, Hidetaka; and Kawata, Toshihiko, 4,716,359, Cl. 323-349.000.

Kawate, Keith W.: *See*—
Charboneau, Thomas J.; and Kawate, Keith W., 4,716,492, Cl. 361-283.000.

Kayashima, Takako: *See*—
Sato, Takashi; Kubo, Emiko; and Kayashima, Takako, 4,716,108, Cl. 435-7.000.

Kearney, James E.: *See*—
Raskin, Donald; Kearney, James E.; and Haznedar, Errol A., 4,716,556, Cl. 367-168.000.

Keefer, Donald W.: *See*—
Fogel, Isaac; and Keefer, Donald W., 4,715,076, Cl. 5-450.000.

Keene Corporation: *See*—
Pahl, Scott; and De Simone, Luigi, 4,716,504, Cl. 362-150.000.

Kehlenbach, Guenther, to H. Krantz GmbH & Co. High-temperature dyeing apparatus. 4,715,199, Cl. 68-198.000.

Keiper Recaro GmbH & Co.: *See*—
Walk, Hansjorg; and Wagener, Heinze-Jurgen, 4,715,656, Cl. 297-362.000.

Kekewich, Douglas E.; and Nelson, Wendall, to Wash World Industries Limited. Washing apparatus. 4,715,079, Cl. 15-97.00B.

Kelly, Kenneth C. Dual polarization flat plate antenna. 4,716,415, Cl. 343-771.000.

Kelly, Kevin A. CHEMFET operation without a reference electrode. 4,716,448, Cl. 357-25.000.

Kelsey, John R. Steady rest for valve grinding apparatus. 4,715,149, Cl. 51-241.0VS.

Kemp, Richard A., to Shell Oil Company. Hydrotreating catalysts prepared from hydrogels. 4,716,140, Cl. 502-211.000.

Kemp, Richard A., to Shell Oil Company. Hydrotreating catalysts prepared from hydrogels. 4,716,141, Cl. 502-211.000.

Kempf, Richard J., to Du Pont de Nemours, E. I., and Company. Solvent developable photoresist composition and process of use. 4,716,093, Cl. 430-277.000.

Kennametal Inc.: *See*—
Hallissy, Robert P.; Isakov, Edmund; Stephenson, Earle W.; and Rowlett, Don C., 4,715,450, Cl. 172-701.300.

Kennedy, Paul E., to McGill Incorporated. Vapor recovery system. 4,715,868, Cl. 55-48.000.

Kennedy, William S.: *See*—
Yasuda, Arthur K.; Kennedy, William S.; and Aronstam, Peter S., 4,715,469, Cl. 181-102.000.

Kenrich Petrochemicals Inc.: *See*—
Sugerman, Gerald; and Monte, Salvatore J., 4,715,968, Cl. 252-8.600.

Kenyon, William G.: *See*—
Connon, Helen A.; Gorski, Robert A.; Kenyon, William G.; and Yokozeki, Akimichi, 4,715,900, Cl. 134-31.000.

Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung: *See*—
Muller, Klaus P., 4,715,216, Cl. 73-61.10C.

Kerrey, John S., to Westinghouse Electric Corp. Apparatus for securing structural tubes in nuclear reactor fuel assemblies. 4,716,017, Cl. 376-446.000.

Kerschbaum, Kurt; and Konicka, Alfred, to Rosendahl Maschinen Gesellschaft m.b.H. Process and apparatus for the production of a cross-linked, extruded or sprayed product. 4,716,000, Cl. 264-83.000.

Keshner, Marvin S.: *See*—
King, Michael O.; and Keshner, Marvin S., 4,715,115, Cl. 29-841.000.

Kesting, Lorenz. Apparatus for mortaring large-format bricks into a wall. 4,715,163, Cl. 52-749.000.

Kevern, James D.; Stape, William J.; and Weber, Robert N., to AMP Incorporated. Fiber optic ferrule. 4,715,675, Cl. 350-96.200.

Keyes, Melvin H., to Owens-Illinois Glass Container Inc. Protein modification to provide enzyme activity. 4,716,116, Cl. 435-183.000.

Khan, Abdul Q.: *See*—
Schellhamer, Alan J.; Barnett, Daniel J.; and Khan, Abdul Q., 4,715,931, Cl. 162-199.000.

Kicherer, Robert: *See*—
Essig, Willi; Kicherer, Robert; and Mayer, Hans, 4,715,569, Cl. 248-27.100.

Kienzle Apparate GmbH: *See*—
Kaiser, Bernhard; and Wokoeck, Ortwin, 4,715,223, Cl. 73-163.000.

Kijima, Naoto: *See*—
Oguri, Yasuo; Saito, Junji; and Kijima, Naoto, 4,716,029, Cl. 423-625.000.

Kijima, Takao; and Ando, Fumitaka, to Mazda Motor Corporation. Vehicle rear-suspension system. 4,715,614, Cl. 280-701.000.

Kijima, Takao; and Ando, Fumitaka, to Mazda Motor Corporation. Vehicle rear-suspension system. 4,715,615, Cl. 280-701.000.

Kikumoto, Ryoji: *See*—
Fukami, Harukazu; Kikumoto, Ryoji; Nakao, Kenichiro; Nitta, Issei; and Inoue, Shinya, 4,716,161, Cl. 514-222.000.

Killian, Joseph R.: *See*—
Fetty, Walter; and Killian, Joseph R., 4,716,180, Cl. 514-782.000.

Killian Latex, Inc.: *See*—
Fetty, Walter; and Killian, Joseph R., 4,716,180, Cl. 514-782.000.

Kim, Bang M., to General Electric Company. Multilayer composite structure for smooth surfaces. 4,716,072, Cl. 428-212.000.

Kim, Eui D.; and Choi, Hyun J., to Gold Star Co., Ltd. Circuit for eyesight protection in a television set. 4,716,469, Cl. 358-245.000.

Kim, Jung T., to Allied Corporation. Composites of metal with carbon fluoride and method of preparation. 4,716,059, Cl. 427-443.100.

Kimberly-Clark Corporation: *See*—
Lang, Theodore B., 4,715,918, Cl. 156-273.100.

Kimura, Katsuhiko: *See*—
Kawanabe, Tomohiko; Asakura, Masahiko; Kushida, Noritaka; and Kimura, Katsuhiko, 4,715,352, Cl. 123-589.000.
Kimura, Tadashi: *See*—
Inaba, Tsutomu; Kimura, Tadashi; Kobayashi, Norihide; Sugihara, Masahiro; and Matsugi, Tetsuzo, 4,715,796, Cl. 418-55.000.
Kimura, Tsunekazu: *See*—
Masuhara, Hiromu; and Kimura, Tsunekazu, 4,716,566, Cl. 371-37.000.
King, Michael O.; and Keshner, Marvin S., to Hewlett-Packard Company. Package for water-scale semiconductor devices. 4,715,115, Cl. 29-841.000.
King, Patrick D., to Flo-Con Systems, Inc. Composite break ring method. 4,715,423, Cl. 164-98.000.
Kinn, Donna A.: *See*—
Kinn, John J.; and Kinn, Donna A., 4,715,564, Cl. 244-153.00R.
Kinn, John J.; and Kinn, Donna A. Chemiluminescent kite. 4,715,564, Cl. 244-153.00R.
Kinoshita, Yoshiaki, to Toyota Jidosha Kabushiki Kaisha. Method and apparatus for controlling heater for heating air-fuel ratio sensor. 4,715,343, Cl. 123-489.000.
Kinoshita, Yoshiaki: *See*—
Oosawa, Kouichi; and Kinoshita, Yoshiaki, 4,715,184, Cl. 60-602.000.
Kioritz Corporation: *See*—
Nagashima, Akira, 4,715,845, Cl. 474-152.000.
Kirby, Diane N.: *See*—
Arnold, Allen J.; Courtney, Mark G.; Kirby, Diane N.; Mis, Katherine H.; and Sutton, Kerry L., 4,715,430, Cl. 165-80.300.
Kirita, Yasuzo: *See*—
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Kirma, Safa: *See*—
Soltow, Uwe; Guthke, Hans-Peter; Plate, Hans-Georg; Lechner, Johann; and Kirma, Safa, 4,715,571, Cl. 248-68.100.
Kirsch, Werner: *See*—
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Kirtley, Robert E. Rail supported articulated climbing dolly. 4,715,769, Cl. 414-571.000.
Kishine, Nobuyuki; Imamura, Tetsuya; and Yamauchi, Michihide, to KAO Corporation. Substrate for a magnetic disc and method manufacturing same. 4,716,078, Cl. 428-336.000.
Kiss, Istvan: *See*—
Timar, Tibor; Zsupan, Kalman; Repasi, Janos; Borsos nee Safranek, Iren; Kiss, Istvan; Fodor, Amdras; and Maroy, Peter, 4,716,238, Cl. 549-408.000.
Kiss, Steven: *See*—
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Kita, Yasuo, to Shimadzu Corporation. Rotary fluid energy converter. 4,715,266, Cl. 91-488.000.
Kitagawa, Keisuke, to Noazi Kasai. Disposable beverage brewer. 4,715,271, Cl. 99-306.000.
Kitano, Kissho; Duvdevani, Ilan; and Schulz, Donald N., to Exxon Research and Engineering Company. Method for controlling viscosity of organic liquids and compositions. 4,715,865, Cl. 44-7.300.
Kito, Yoshikazu, to Hoshizaki Electric Co., Ltd. Ice making machine with water distributor. 4,715,194, Cl. 62-347.000.
Kiuchi, Takao, to Fuji Photo Film Co., Ltd. Camera-combined magnetic recording-reproducing system. 4,716,474, Cl. 360-33.100.
Kizaki, Masami: *See*—
Fujita, Masahito; Kizaki, Masami; Miyazaki, Makoto; and Inaba, Naomi, 4,716,206, Cl. 526-139.000.
Kjelgaard, Tom; Hallberg, Anders; and Jacobsson, Kenth, to Tetra Pak International AB. Reclosable opening arrangement on a packing container. 4,715,528, Cl. 229-123.100.
Kjornaes, Kim; Christensen, Finn N.; and Jensen, Jens R., to A/S Alfred Benzon. Diffusion coated multiple-units dosage form. 4,716,041, Cl. 424-468.000.
Klabunde, Ulrich, to Du Pont de Nemours, E. I., and Company. Nickel-catalyzed polymerization of ethylene. 4,716,205, Cl. 526-115.000.
Klaucic, Luciano, to Continua International Continuous Casting S.p.A. Machine for the curved continuous casting with rigid starting bar. 4,715,426, Cl. 164-426.000.
Klauke, Erich; Baasner, Bernd; and Schundehutte, Karl H., to Bayer Aktiengesellschaft. New pyrimidines and a process for the preparation of pyrimidines. 4,716,229, Cl. 544-334.000.
Kleemann, Axel; Klenk, Herbert; and Schulz, Wolfgang, to Degussa Aktiengesellschaft. Process for the production of thiosemicarbazide. 4,716,247, Cl. 564-18.000.
Kleemann, Axel: *See*—
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Engel, Jurgen; Kleemann, Axel; Niemeyer, Ulf; Hilgard, Peter; and Pohl, Joerg, 4,716,242, Cl. 558-81.000.
Klein, Max. Composite materials, their preparation and articles made therefrom. 4,716,062, Cl. 428-36.000.
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Klockner-Humboldt-Deutz AG Zweigniederlassung Fahr: *See*—
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Klockner-Humboldt-Deutz Aktiengesellschaft: *See*—
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Kneifel, Jerome J., to Dale Electronics, Inc. High power density, low corona resistor. 4,716,396, Cl. 338-226.000.
Knight, John K., to R.F.D. Consultants Pty. Ltd. Basketball game and court. 4,715,598, Cl. 272-3.000.
Knoll, Frank: *See*—
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Knoll, Frederick L., to Boeing Company, The. Apparatus for consolidating composite materials. 4,715,923, Cl. 156-380.900.
Koakutsu, Yasumasa: *See*—
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Kobayashi, Kiyotaka; Tsukasaki, Hidaka; and Baba, Takaaki, to Nippondenso Co., Ltd. Self-diagnosis system for exhaust gas recirculation system of internal combustion engine. 4,715,348, Cl. 123-571.000.
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Koch, Thomas L.: *See*—
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Koek, Kevin C.; Matthias, William T.; and Barton, James T., to Eastman Kodak Company. Mount for imaging lens array on optical print head. 4,715,682, Cl. 350-253.000.
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Kohnke, William M. Spent cartridge collector. 4,715,141, Cl. 42-98.000.
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Koike, Hideharu, to Kabushiki Kaisha Toshiba. Low pass filter formed in an integrated circuit. 4,716,318, Cl. 307-520.000.
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Kon, Terrance A.: *See—*
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Kondo, Shigeyuki, to NEC Corporation. Device for modifying program duration on a tape player. 4,716,473, Cl. 360-9.100.
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Kondoh, Hitoshi; and Sueda, Akihiro, to Kabushiki Kaisha Toshiba. Semiconductor integrated circuit device constructed by polycell technique. 4,716,452, Cl. 357-68.000.
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Konicka, Alfred: *See—*
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Konishi, Masahiro, to Fuji Photo Film Co., Ltd. Light amount correction method and apparatus for image output system. 4,716,285, Cl. 250-205.000.
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Kopatz, Nelson E.; and Pruyne, Lori S., to GTE Products Corporation. Process for producing finely divided spherical glass powders. 4,715,878, Cl. 65-21.100.
Kopp, Richard: *See—*
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Koppa, Daniel A., to Nabisco Brands, Inc. Triple co-extruder. 4,715,803, Cl. 425-133.100.
Korzeniowski, Stephen H., to Du Pont de Nemours, E. I., and Company. Fluorine-containing copolymers. 4,716,208, Cl. 526-245.000.
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Koseki, Hiroyuki: *See—*
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Isobe, Minoru; Koshida, Yoshinori; and Yuasa, Katunori, 4,715,594, Cl. 271-65.000.
Koskinen, Erkki, to Oy W. Rosenlew Ab. Flexible container for transporting and storing bulk goods. 4,715,635, Cl. 294-68.100.
Koster, Helmut. Automatic control of incident solar flux. 4,715,358, Cl. 126-439.000.
Kosuge, Minoru: *See—*
Sato, Naoki; Kamo, Yoshihisa; Katoh, Yasuhiro; Kosuge, Minoru; and Arai, Shinichi, 4,716,306, Cl. 307-296.00R.
Kotilainen, Timo: *See—*
Wilkman, Goran; Kotilainen, Timo; Pulliainen, Juha; and Lindqvist, Gustav, 4,715,305, Cl. 114-40.000.
Kottke, Louis E., to Acco Babcock Inc. Method of making a flexible cable assembly. 4,716,061, Cl. 264-145.000.
Kouge, Shinichi: *See—*
Morishita, Mitsuharu; and Kouge, Shinichi, 4,716,355, Cl. 320-64.000.
Kouns, Herbert H.; and Gardner, Loren D., to Abex Corporation. Servo control variable displacement pressure compensated pump. 4,715,788, Cl. 417-218.000.
Koyokawa, Morio; and Fujimoto, Akihiko, to Mitsubishi Denki Kabushiki Kaisha. Numerical control apparatus. 4,716,349, Cl. 318-562.000.
Krambrock, Wolfgang, to AVT Anlagen- und Verfahrenstechnik GmbH. Process and equipment for pneumatic and hydraulic transport of bulk materials through pipes. 4,715,748, Cl. 406-11.000.
Krambrock, Wolfgang; and Hoppe, Hans, to Waeschle Maschinenfabrik GmbH. Apparatus for separating granulate material. 4,715,951, Cl. 209-138.000.
Kramer, John F., deceased; by Van Oosting, Barbara B., executrix; and by Wessberg, Karen S., executrix. Outdoor lighting pedestal. 4,716,508, Cl. 362-431.000.
Kramer, S. Bertram; and Sampatacos, Evan P., to McDonnell Douglas Helicopter Co. Roll turret for a gun mount. 4,715,263, Cl. 89-37.210.
Kramer, Thomas J.: *See—*
Kapoor, Anoop; Choby, Edward J.; Kramer, Thomas J.; Ranieri, James E.; Roth, Charles H., Jr.; Scheffer, Donald E.; Spehar, John E., Jr.; Bessko, Csaba; and Blumstein, Robert M., 4,715,111, Cl. 29-723.000.
Kramer, Wolfgang; Buchel, Karl H.; Frohberger, Paul-Ernst; Brandes, Wilhelm; and Lurssen, Klaus, to Bayer Aktiengesellschaft. Substituted triazolyl-methyl-tert-butyl carbinol compounds and plant protection agents. 4,715,887, Cl. 71-92.000.
Krause, Joachim; Wachtler; and Scheuble, Bernhard, to Merck Patent Gesellschaft mit beschrankter Haftung. Liquid-crystalline dihydroazines. 4,715,984, Cl. 252-299.610.
Krauss-Maffei A.G.: *See—*
Ehrler, Ernst; Eichlseder, Martin; and Theiss, Edmund, 4,715,806, Cl. 425-553.000.
Kremendahl, Juergen, to Globus Fussstutzenfabrik Karl Kremendahl. Orthopedic supporting member, particularly orthopedic shoe inserts, and method of its manufacture. 4,715,131, Cl. 36-44.000.
Kress, Hermann, to Hansa Metallwerke AG. Control disc valve. 4,715,406, Cl. 137-625.170.
Kreuter, Peter. Electromagnetically-actuated positioning mechanisms. 4,715,331, Cl. 123-90.110.
Kreuter, Peter. Electromagnetically-actuated positioning system. 4,715,332, Cl. 123-90.110.
Krischke, Hermann: *See—*
Langhoff, Josef; Krischke, Hermann; Geldmacher, Horst; Golomb, Manfred; Kamp, Karl-Heinz; Masuch, Peter; and Chalupnik, Rolf, 4,715,809, Cl. 431-170.000.
Kristinsson, Haukur: *See—*
Lukaszczyk, Alfons; Martin, Henry; Diel, Peter J.; Fory, Werner; Gotzi, Karl; Kristinsson, Haukur; Muller, Beat; Muntwyler, Rene ; Pachlatko, Johannes P.; Rempfler, Hermann; Schurter, Rolf; and Szczepanski, Henry, 4,715,883, Cl. 71-90.000.
Kruger, Bernd-Wieland; Lockhoff, Oswald; Metzger, Karl G.; Opitz, Hans-Georg; Schaller, Klaus; Stunkel, Klaus G.; and Zeiler, Hans-Joachim, to Bayer Aktiengesellschaft. Pharmaceutical use of substituted O-acylglycosides. 4,716,152, Cl. 514-25.000.
Kryscyk, Robert, to Deere & Company. Power lift for a lifting device. 4,715,770, Cl. 414-680.000.
Kubo, Emiko: *See—*
Sato, Takashi; Kubo, Emiko; and Kayashima, Takako, 4,716,108, Cl. 435-7.000.
Kubota, Hisashi: *See—*
Sekine, Yoshitada; Yokota, Fumiki; and Kubota, Hisashi, 4,715,709, Cl. 356-237.000.
Kubota Tekko Kabushiki Kaisha: *See—*
Yano, Naomichi; Ueno, Tadatsugu; and Tsuboi, Shigeru, 4,715,978, Cl. 252-70.000.
Kucza, Iosif. Apparatus for rapid cooling of containers. 4,715,195, Cl. 62-376.000.
Kudo, Kazunori: *See—*
Sakai, Shigeru; and Kudo, Kazunori, 4,716,576, Cl. 375-5.000.
Kudo, Koji: *See—*
Maruyama, Masanori; Takahashi, Kenji; Kudo, Koji; Hombaugh, Masanori; and Nagahara, Shusaku, 4,716,468, Cl. 358-219.000.
Kuhn, Heinrich; Stitz, Olaf; and Wimmer, Karl, to Sigri GmbH. Method for coating carbon and graphite bodies. 4,716,572, Cl. 373-88.000.
Kuhn, Ulrich, to Robert Bosch GmbH. Method and apparatus for measuring the mass of a flowing medium. 4,715,224, Cl. 73-204.000.
Kukes, Simon G.: *See—*
Sughrue, Edward L., II; Kukes, Simon G.; and Hogan, Robert J., 4,715,948, Cl. 208-251.00H.
Kulander, Hans, to MRT System Aktiebolag. Apparatus for recovering fluorescent material from mercury vapor discharge lamps. 4,715,838, Cl. 445-61.000.
Kulbersh, Irwin, to Amco Corporation. Clip for coupling shelf assemblies. 4,715,741, Cl. 403-389.000.
Kumakura, Seiji: *See—*
Tomita, Kuniyuki; Shimoji, Yasuo; Kumakura, Seiji; Koike, Hiroyuki; Iwata, Nobuyoshi; and Morisawa, Yasuhiro, 4,716,162, Cl. 514-234.000.
Kummer Electronics B.V.: *See—*
Kummer, Jan, 4,715,405, Cl. 137-625.200.
Kummer, Jan, to Kummer Electronics B.V. Solenoid valve, particularly for apparatus for removing a milking set. 4,715,405, Cl. 137-625.200.
Kunieda, Mitsuyuki: *See—*
Matsuo, Kenji; Sasaki, Itsuo; Suzuki, Hiroaki; and Kunieda, Mitsuyuki, 4,716,308, Cl. 307-303.000.
Kuno, Akira: *See—*
Hattori, Yoshiyuki; Matsui, Kazuma; Imani, Yuichi; Kuno, Akira; Nagata, Tetsuya; Nakane, Koji; and Nomura, Ken, 4,715,663, Cl. 303-110.000.
Kuntze, Rupert. Fishing line supply spool and method of use. 4,715,554, Cl. 242-84.20R.
Kunze, Peter; and Kirsch, Werner, to Wiederaufarbeitungsanlage Karlsruhe Betriebsgesellschaft mbH. Fuel element shears having a stepped blade. 4,715,256, Cl. 83-694.000.
Kuo, George; Masiarz, Frank R.; Truett, Martha; Valenzuela, Pablo; Rasmussen, Mirella E.; and Favaloro, Jennifer, to Chiron Corporation; and Nordisk Gentofte. Monoclonal antibodies to factor VIIIC. 4,716,117, Cl. 435-240.270.
Kuraray Co., Ltd.: *See—*
Gion, Hidenori; Yoda, Takumi; Kirita, Yasuzo; Zaima, Kazuhito; and Kurata, Noriyuki, 4,715,849, Cl. 604-52.000.
Kurata, Noriyuki: *See—*
Gion, Hidenori; Yoda, Takumi; Kirita, Yasuzo; Zaima, Kazuhito; and Kurata, Noriyuki, 4,715,849, Cl. 604-52.000.
Kuribayashi, Yukio, to Aica Kogyo Co., Ltd. Key sensing system. 4,716,400, Cl. 340-572.000.
Kuroda, Hiroshi: *See—*
Sato, Koji; Kuroda, Hiroshi; Yamada, Ryuji; and Serino, Mamoru, 4,715,657, Cl. 299-1.000.
Kurosawa, Tomoe: *See—*
Ohno, Yasunori; Kurosawa, Tomoe; Sato, Tadashi; and Ohshita, Youichi, 4,716,491, Cl. 361-230.000.
Kushida, Noritaka: *See—*
Kawanabe, Tomohiko; Kushida, Noritaka; Asakura, Masahiko; and Seki, Yasunari, 4,715,350, Cl. 123-587.000.
Kawanabe, Tomohiko; Asakura, Masahiko; Kushida, Noritaka; and Kimura, Katsuhiko, 4,715,352, Cl. 123-589.000.
Kusmierz, Hans: *See—*
Goepel, Ernst; and Kusmierz, Hans, 4,716,422, Cl. 346-140.00R.

Kuwahara, Heikichi: *See*—
Takahashi, Kenji; Kuwahara, Heikichi; Yanagida, Takehiko; Nakayama, Wataru; Oizumi, Kiyoshi; and Sugimoto, Shigeo, 4,715,436, Cl. 165-133.000.

Kuzuya, Susumu; and Imaizumi, Mamoru, to Brother Kogyo Kabushiki Kaisha. Dual mode printing apparatus with multiple print ribbon cassettes. 4,715,735, Cl. 400-82.000.

Kyocera Corporation: *See*—
Horiuchi, Akito; Yokoyama, Kiyoshi; and Yoshida, Makoto, 4,716,133, Cl. 501-97.000.

Kyotani, Yasuhiro: *See*—
Kagawa, Hirohiko; Kyotani, Yasuhiro; and Torii, Munetomo, 4,716,184, Cl. 523-310.000.

Kyowa Hakko Kogyo Co., Ltd.: *See*—
Yamauchi, Takayoshi; Hattori, Kaneaki; Ikeda, Shunichi; and Tamaki, Kentaro, 4,716,241, Cl. 558-44.000.

L-TEC Company: *See*—
Carkhuff, Donald W., 4,716,269, Cl. 219-121.0PQ.

Laboratorien Hausmann AG: *See*—
Geisser, Peter; Kaiser, Hans P.; and Berger, Franz, 4,715,851, Cl. 604-82.000.

Laborde, Michel: *See*—
Le Page, Jean-Francois; Billon, Alain; Morel, Frederic; Renard, Pierre; Biedermann, Jean-Michel; Laborde, Michel; and Bousquet, Jacques, 4,715,946, Cl. 208-45.000.

Laby, Jordan M.: *See*—
Henkin, Melvyn L.; and Laby, Jordan M., 4,715,071, Cl. 4-542.000.

Laine, Richard M.; Hirschon, Albert S.; and Wilson, Robert B., Jr., to SRI International. Catalysts for the hydrodenitrogenation of organic materials and process for the preparation of the catalysts. 4,716,142, Cl. 502-220.000.

Laing, Gordon E.: *See*—
Harris, Frank R.; and Laing, Gordon E., 4,715,083, Cl. 15-323.000.

L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes George Claude: *See*—
Pean, Jean-Louis; Desvard, Catherine; and Barbier, Jean-Paul, 4,715,985, Cl. 252-305.000.

Lait, Andrew J., to Canadian Marconi Company. Waveguide to stripline transition. 4,716,386, Cl. 333-26.000.

Laitram Corporation, The: *See*—
Lapeyre, George C.; Greve, Christopher G.; and Ruys, Hendrik J., 4,715,093, Cl. 17-71.000.

Lake Center Industries: *See*—
Toulouse, Charles P., 4,716,264, Cl. 200-61.860.

Lamanna, Anthony. Set of golf clubs and method of matching same. 4,715,601, Cl. 273-77.00A.

Lamberg, John R.: *See*—
Gawronski, Michael J.; and Lamberg, John R., 4,716,389, Cl. 333-81.00A.

Lambousy, George G.; Reaves, Benjamin H.; and Nelson, William E., to Amoco Corporation. Bubble cap assembly. 4,715,996, Cl. 261-114.200.

Landgraf, Heinrich. Gem faceting machine. 4,715,148, Cl. 51-229.000.

Landrevie, Jacques, to Societe Nouvelle Rockall France S.A. Electrical connection for electronic circuits. 4,715,828, Cl. 439-660.000.

Lang, Joseph H., to Xerox Corporation. Charge erase device with flare light control. 4,716,436, Cl. 355-3.0CH.

Lang, Theodore B., to Kimberly-Clark Corporation. Method for forming discrete particulate areas in a composite article. 4,715,918, Cl. 156-273.100.

Langhoff, Josef; Krischke, Hermann; Geldmacher, Horst; Golomb, Manfred; Kamp, Karl-Heinz; Masuch, Peter; and Chalupnik, Rolf, to Ruhrkohle AG. Fluidized bed having modified surfaces in the heat extractor. 4,715,809, Cl. 431-170.000.

Langowski, Faustyn C.: *See*—
Berry, Joe R.; Langowski, Faustyn C.; Renfro, James G.; and Smith, Roger, Jr., 4,715,761, Cl. 414-22.000.

Lanigan, John J., Sr.; Glickman, Myron; George, Thazhuthekudiyil V.; and Ermel, Bernard A., to Mi-Jack Products, Inc. Grappler system for lifting apparatus. 4,715,762, Cl. 414-126.000.

Lapeyre, George C.; Greve, Christopher G.; and Ruys, Hendrik J., to Laitram Corporation, The. Trimming and cutting apparatus for the preparation of crabs for meat extraction. 4,715,093, Cl. 17-71.000.

Larque, Hubert. Counterfoil binding. 4,715,759, Cl. 412-33.000.

Larsen, Merle D.: *See*—
Cummings, Richard E.; Mackey, Charles S.; Dickinson, Robert W.; Dickinson, Ben W. O., III; and Larsen, Merle D., 4,715,128, Cl. 33-544.000.

LaRue, George S.: *See*—
Davenport, William H.; McCormack, Gary D.; and LaRue, George S., 4,716,311, Cl. 307-448.000.

Laskowitz, Joseph F. Reclining chair with retractable footrest. 4,715,654, Cl. 297-329.000.

Lattig, Krail N. Arrow rest for archery bow. 4,715,355, Cl. 124-41.00A.

Laughlin, Raymond S.: *See*—
Carraro, Eugene; and Laughlin, Raymond S., 4,715,161, Cl. 52-714.000.

Lavallee, Francois A., to Essex Group, Inc. Method for equilibrating polyamide magnet wire coatings and enamel compositions. 4,716,190, Cl. 524-386.000.

Lavie, Louis F., to Dridrinks N.V. Pulverulent water-soluble nonhygroscopic composition for preparing beverages with a lasting effervescence and method for preparing the same. 4,716,046, Cl. 426-96.000.

Lawall, Thomas R., to Fuller Company. Process and apparatus for manufacturing low sulfur cement clinker. 4,715,811, Cl. 432-58.000.

Lawruk, Stephen P.: *See*—
Jackson, Mark F.; Lawruk, Stephen P.; Schlegel, Dallas E.; and Spong, Richard V., 4,715,112, Cl. 29-739.000.

Lawson, Bobby R.: *See*—
Muller, Gary R.; Theiss, Scott M.; Brown, James E., Jr.; and Lawson, Bobby R., 4,715,324, Cl. 122-381.000.

Lazzarini, Anna M.: *See*—
Scarponi, Ugo; Lazzarini, Anna M.; Toti, Daniela; and de Castiglione, Roberto, 4,716,228, Cl. 540-578.000.

Lear Fan Limited: *See*—
Loyek, Ernie F., 4,715,560, Cl. 244-177.00R.

Lebedev, Vladimir K.; Chernenko, Ivan A.; Dyshlenko, Alexandr T.; Litvin, Leonid V.; and Tishura, Vladimir I. Electromagnetic power drive for a friction welding machine. 4,715,523, Cl. 228-2.000.

Lechner, Johann: *See*—
Soltow, Uwe; Guthke, Hans-Peter; Plate, Hans-Georg; Lechner, Johann; and Kirma, Safa, 4,715,571, Cl. 248-68.100.

Lecolant, Rene : *See*—
Tirelli, Marco; Lecolant, Rene ; and Hecquet, Raoul, 4,715,917, Cl. 156-250.000.

Ledley, Robert S.; and Gersten, Douglas M., to Georgetown University. Radioopaque sugar derivatives and a method of metabolic mapping using the same. 4,716,225, Cl. 536-122.000.

Lee, Byeong G.: *See*—
Angell, Eric H.; Aprille, Thomas J.; Azaret, Juan O.; Fang, Rong-Chin; Lee, Byeong G.; Longwell, Brian C.; Sharper, Craig A.; and Spalink, Jan-Dieter, 4,716,561, Cl. 370-55.000.

Lee Company, The: *See*—
Lee, Leighton, II; and Kolp, Robert J., 4,715,231, Cl. 73-709.000.

Lee Controls, Inc.: *See*—
Magnuson, Robert E., 4,715,730, Cl. 384-52.000.

Lee, Jen S.: *See*—
Houck, David L.; Port, David J.; and Lee, Jen S., 4,716,019, Cl. 419-17.000.

Lee, Kon J.; and Musset, Anthony, to Denton Vacuum Inc. Pre-ionization aided sputter gun. 4,716,340, Cl. 315-111.410.

Lee, Leighton, II; and Kolp, Robert J., to Lee Company, The. Maximum pressure indicator. 4,715,231, Cl. 73-709.000.

Lee, Norman C., to Zarn, Inc. Plant container with concavoconvex ribs. 4,715,144, Cl. 47-66.000.

Leese, David J.; and Ashby, Robert E., to Moore Business Forms, Inc. Two-part mailer with return envelope. 4,715,530, Cl. 229-73.000.

LeFebure Corporation: *See*—
Podoll, Michael J.; and Jensen, Peter J., 4,715,750, Cl. 406-111.000.

Lehoczky, Ken, to GSE, Inc. Single pulse peak circuit for torque verification. 4,715,211, Cl. 73-1.00C.

Leiber, Heinz, to Robert Bosch GmbH. Hydraulic brake booster. 4,715,661, Cl. 303-10.000.

Leineweber, Michael: *See*—
Caruthers, Marvin H.; Leineweber, Michael; Leitner, Moshe; and Stabinsky, Yitzhak, 4,716,217, Cl. 530-351.000.

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Leland Stanford Junior University, The Board of Trustees of the: *See*—
Moslehi, Mehrdad M.; Fu, Chi Y.; and Saraswat, Krishna, 4,715,937, Cl. 204-177.000.

Lenz, Henry G.: *See*—
Shah, Manoj R.; and Lenz, Henry G., 4,716,328, Cl. 310-178.000.

Leo Stahl AG: *See*—
Stahl, Leo, 4,715,459, Cl. 180-6.480.

Leonard, Ronald J., to Baxter Travenol Laboratories, Inc. Hollow fiber separation device manifold. 4,715,953, Cl. 210-321.800.

Le Page, Jean-Francois; Billon, Alain; Morel, Frederic; Renard, Pierre; Biedermann, Jean-Michel; Laborde, Michel; and Bousquet, Jacques, to Institut Francais du Petrole. Process for deasphalting a hydrocarbon charge containing asphaltenes. 4,715,946, Cl. 208-45.000.

Lerner, Bernard; Liebhart, Dana; and Wehrmann, Rick S., to Automatic Packaging Systems, Inc. Apparatus and method for cutting slaughtered poultry into separate pieces. 4,715,092, Cl. 17-52.000.

Leroy, Claude; Millot, Jean-Paul; and Desfontaines, Guy, to Framatome & Cie. Device for control of the core of a nuclear reactor. 4,716,008, Cl. 376-237.000.

Lesher, George Y.; and Singh, Baldev, to Sterling Drug Inc. 5-[1H-(5-membered-N-aromatic heteryl)-1-yl]-1,6-naphthyridin-2(1H)-ones and their cardiotonic use. 4,716,170, Cl. 514-300.000.

Lever Brothers Company: *See*—
Biernoth, Gerhard; Menz, Hans-Udo; Todt, Klaus H.; and Wieske, Theophil, 4,716,047, Cl. 426-603.000.

Levine, Alfred B. Method for previewing undeveloped film. 4,716,470, Cl. 358-256.000.

Levy, Jay A., to University of California, Regents of the. Purified AIDS-associated virus ARV-2. 4,716,102, Cl. 435-5.000.

Levy, Roland A.: *See*—
Green, Martin L.; Levy, Roland A.; and Nuzzo, Ralph G., 4,716,050, Cl. 427-99.000.

Lewin, David F., to Owens-Corning Fiberglass Corporation. Size composition. 4,716,080, Cl. 428-389.000.

Lewis, Idris; and Churchill, John, to Ford Motor Company. Bumper bar for a motor vehicle. 4,715,645, Cl. 296-120.00R.

Lewis, Julie M. Accouchement apparatus. 4,715,592, Cl. 269-328.000.

Lewis, Paul H., to Texaco Inc. Process of preparing a catalyst containing activated isomerization sites. 4,716,137, Cl. 502-74.000.

Lewis, Richard T.: *See*—
Tallon, James A.; and Lewis, Richard T., 4,715,897, Cl. 106-284.000.

Leys, Cassius W.: *See*—
Fox, Frank; and Leys, Cassius W., 4,716,056, Cl. 427-407.100.
Liberg, Lars-Olof, to Gotaverken Arendal AB. Device for the handling of liquids. 4,715,309, Cl. 114-125.000.
Libregts, Hubertus B.: *See*—
Mouissie, Bob; and Libregts, Hubertus B., 4,715,825, Cl. 439-391.000.
Lichter, Robert J. Safe construction and rebar coupling device for use therewith. 4,715,297, Cl. 109-50.000.
Liebhart, Dana: *See*—
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Liedtke, Kurt: *See*—
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Liegel, Reinald D., to Hein-Werner Corporation. Convertible tool tray and support stand for mechanics tool. 4,715,573, Cl. 248-129.000.
Liegel, Reinald D.; and Ballard, James G., to Hein-Werner, Inc. High speed hydraulic fluid venting valve in a hydraulic fluid pump. 4,715,789, Cl. 417-253.000.
Liethschmidt, Klaus: *See*—
von Matuschka, Alfred G.; Liethschmidt, Klaus; Webert, Hubertus; and Kohler, Emil K., 4,715,812, Cl. 432-258.000.
Lin, Yang-I: *See*—
Bitha, Panayota; Child, Ralph G.; Hlavka, Joseph J.; and Lin, Yang-I, 4,716,157, Cl. 514-184.000.
Lind, Richard C.: *See*—
O'Meara, Thomas R.; and Lind, Richard C., 4,715,689, Cl. 350-354.000.
Linde Aktiengesellschaft: *See*—
Fuchs, Uwe, 4,715,958, Cl. 210-605.000.
Linden, Olavi, to Fiskars Oy AB. Plastic handle scissors. 4,715,122, Cl. 30-254.000.
Lindquist, John, to Universal Manufacturing Corporation. Constant illumination, remotely dimmable electronic ballast. 4,716,343, Cl. 315-307.000.
Lindqvist, Bengt L.: *See*—
Malson, Tomas; and Lindqvist, Bengt L., 4,716,154, Cl. 514-54.000.
Lindqvist, Gustav: *See*—
Wilkman, Goran; Kotilainen, Timo; Pulliainen, Juha; and Lindqvist, Gustav, 4,715,305, Cl. 114-40.000.
Lindstrom, Richard L. Epicorneal lens. 4,715,858, Cl. 623-5.000.
Ling Electronics, Inc.: *See*—
Butts, Gary, 4,715,229, Cl. 73-663.000.
Lingnau, Horst, to Woma-Apparatebau Wolfgang Maasberg & Co., GmbH. Swirl jet nozzle as a hydraulic work tool. 4,715,538, Cl. 239-248.000.
Lingner & Fischer GmbH: *See*—
Gollub, Hans J.; Hechenberger, Dieter A.; and Moermann, Renate, 4,716,189, Cl. 524-284.000.
Lion Corporation: *See*—
Hirakouchi, Yoshie; Toisawa, Osamu; and Takahashi, Masatoshi, 4,715,991, Cl. 252-555.000.
Lipinski, Reinhard; and Kaiser, Siegmund H., to PROMA Produkt-und Marketing Gesellschaft mbH. Mechanical linear drive system. 4,715,241, Cl. 74-89.150.
Lisle Corporation: *See*—
Pool, James L., 4,716,365, Cl. 324-158.00P.
List, Hans: *See*—
Fauser, Edwin; and List, Hans, 4,716,372, Cl. 328-146.000.
Littmann, Wolfgang: *See*—
Ernst, Hansgeorg; Littmann, Wolfgang; and Paust, Joachim, 4,716,243, Cl. 558-395.000.
Litton Systems Inc.: *See*—
Hutchings, Thomas J., 4,715,713, Cl. 356-350.000.
Litvin, Leonid V.: *See*—
Lebedev, Vladimir K.; Chernenko, Ivan A.; Dyshlenko, Alexandr T.; Litvin, Leonid V.; and Tishura, Vladimir I., 4,715,523, Cl. 228-2.000.
Liu, Christopher S.: *See*—
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Livick, Lester R. Door lock drilling template. 4,715,125, Cl. 33-197.000.
Livsey, Terry; and Foulkes, Graham T., to Rolls-Royce plc. Inspection apparatus. 4,715,228, Cl. 73-640.000.
Llort, Francisco M.; Gendreau, Paul M.; and Berard, Raymond A., to Acushnet Company. Golf ball composition. 4,715,607, Cl. 273-218.000.
Lloyd, Mervin R.; and Kon, Terrance A. Snow trap attachment for crop harvesting machine. 4,715,174, Cl. 56-297.000.
Lobanoff, Mark; and Gavagan, James A., to Irvin Industries, Inc. Spring-loaded hinge assembly for vehicle accessories. 4,715,644, Cl. 296-97.00H.
Locke, Philip F., Jr.; and Ignatius, Mark J., to Nordson Corporation. Method of checking channel connections and detecting heater circuit and temperature sensor malfunctions in multi-channel closed loop hot melt heating systems. 4,716,519, Cl. 364-186.000.
Locke, Philip F., Jr.; and Ignatius, Mark J., to Nordson Corporation. Method of checking channel connections and detecting heater circuit and temperature sensor malfunctions in multi-channel closed loop hot melt heating systems. 4,716,520, Cl. 364-186.000.
Lockhoff, Oswald: *See*—
Kruger, Bernd-Wieland; Lockhoff, Oswald; Metzger, Karl G.; Opitz, Hans-Georg; Schaller, Klaus; Stunkel, Klaus G.; and Zeiler, Hans-Joachim, 4,716,152, Cl. 514-25.000.
Lofgren, Karl M. J.; Shearer, Gerald W.; and Ouyang, Kenneth W., to Western Digital Corporation. Precise phase start-up voltage controlled oscillator with accurate duty cycle. 4,716,383, Cl. 331-117.0FE.
Logie, Frank M., to Lucas Industries public limited company. Electromagnetic actuator. 4,716,393, Cl. 335-261.000.
Long, Judith A.: *See*—
Johnston, Wilbur D., Jr.; and Long, Judith A., 4,716,130, Cl. 437-104.000.
Longobardi, Roberto. Fuel-economy and emission-control device for internal combustion engines. 4,715,354, Cl. 123-590.000.
Longwell, Brian C.: *See*—
Angell, Eric H.; Aprille, Thomas J.; Azaret, Juan O.; Fang, Rong-Chin; Lee, Byeong G.; Longwell, Brian C.; Sharper, Craig A.; and Spalink, Jan-Dieter, 4,716,561, Cl. 370-55.000.
Lopes, John A.; and Stanton, James H., to Diversey Wyandotte Corporation. Antimicrobial sanitizing composition containing n-alkyl and n-alkenyl succinic acid and methods for use. 4,715,980, Cl. 252-106.000.
L'Oreal: *See*—
Zabotto, Arlette; and Contamin, Jean-Claude, 4,715,982, Cl. 252-174.170.
Lotz, Werner; Fuchs, Karlheinz; and Haller, Siegmund, to Hoechst Aktiengesellschaft. Economy chrome tanning process with aldehyde-acids and keto-acids. 4,715,861, Cl. 8-94.180.
Loughran, James A.: *See*—
Yerman, Alexander J.; and Loughran, James A., 4,716,124, Cl. 437-8.000.
Lovie, John R.; Somers, Gerardus A.; and Hendriks, Jan J. M., to OMI International Corporation. Palladium and palladium alloy plating. 4,715,935, Cl. 204-44.600.
Loyek, Ernie F., to Lear Fan Limited. Composite cruciform structure for joining intersecting structural members of an airframe and the like. 4,715,560, Cl. 244-177.00R.
LTH Associates: *See*—
Tamminen, Pentti, 4,715,934, Cl. 204-10.000.
Lu, Jing-Jong; and Wehrmeister, Herbert L., to International Minerals & Chemical Corp. Process for preparing phthalimido isoxazoles. 4,716,233, Cl. 548-245.000.
Lucas Industries public limited Company: *See*—
Farr, Glyn P. R., 4,715,666, Cl. 303-116.000.
Logie, Frank M., 4,716,393, Cl. 335-261.000.
Lucassen, Gunter: *See*—
Hergeth, Adolph; Lucassen, Gunter; and Pinto, Akiva, 4,715,722, Cl. 366-132.000.
Lukaszczyk, Alfons; Martin, Henry; Diel, Peter J.; Fory, Werner; Gotzi, Karl; Kristinsson, Haukur; Muller, Beat; Muntwyler, Rene ; Pachlatko, Johannes P.; Rempfler, Hermann; Schurter, Rolf; and Szczepanski, Henry, to Ciba-Geigy Corporation. Thiadiazolyl-glyoxylonitrile-2-oxime ether derivatives for protecting plant crops. 4,715,883, Cl. 71-90.000.
Lum, Kin K.: *See*—
Vanier, Noel R.; Lum, Kin K.; and Bowman, Wayne A., 4,716,144, Cl. 503-227.000.
Lunkenheimer, Winfried: *See*—
Marzolph, Gerhard; Lunkenheimer, Winfried; and Fedtke, Carl, 4,715,888, Cl. 71-93.000.
Luperti, Harry E.; Person, Eric N.; and Simmel, Thomas, to Pitney Bowes Inc. High speed envelope flap opener. 4,715,164, Cl. 53-381.00R.
Lurssen, Klaus: *See*—
Kramer, Wolfgang; Buchel, Karl H.; Frohberger, Paul-Ernst; Brandes, Wilhelm; and Lurssen, Klaus, 4,715,887, Cl. 71-92.000.
Luttrell, Stephen P.; and Oliver, Christopher J., to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the. Super resolution imaging system. 4,716,414, Cl. 342-179.000.
Lymore Limited: *See*—
Brosch, Richard W., 4,715,425, Cl. 164-418.000.
Lynm, Dwo; Morrison, Carl C.; and Hutcherson, Ronald W., Sr., to R. J. Reynolds Tobacco Company. Cigarette. 4,715,389, Cl. 131-335.000.
M/A-Com, Inc.: *See*—
Carr, Kenneth L., 4,715,727, Cl. 374-122.000.
M.A.N. Roland Druckmaschinen Aktiengesellschaft: *See*—
Ottlik, Norbert, deceased, 4,715,204, Cl. 72-76.000.
M&T Chemicals Inc.: *See*—
Thorpe, John E.; and Sarang, Gursharan S., 4,715,116, Cl. 29-846.000.
MacAllister, Donald J.; and Pennington, Virginia W., to Atlantic Richfield Company. Method for recovery of hydrocarbons. 4,715,444, Cl. 166-269.000.
MacConnell, John: *See*—
Brink, Douglas F.; and MacConnell, John, 4,715,633, Cl. 294-31.200.
Machida, Naoyoshi: *See*—
Sugiyama, Makoto; Sugimura, Hiroshi; Machida, Naoyoshi; and Murai, Yoshiichi, 4,715,121, Cl. 30-253.000.
Macias, Jorge: *See*—
Baillie, William R.; Macias, Jorge; and Dressendorfer, Michael, 4,715,669, Cl. 312-12.000.
Mack, Gerhard; Mueller, Birgit; Jung, Guenter; and Frass, Werner, to Hoechst Aktiengesellschaft. Developer for preparing printing forms and process therefor. 4,716,098, Cl. 430-331.000.
Mackey, Charles S.: *See*—
Cummings, Richard E.; Mackey, Charles S.; Dickinson, Robert W.; Dickinson, Ben W. O., III; and Larsen, Merle D., 4,715,128, Cl. 33-544.000.

MacLellan, Bruce D., to Eastman Kodak Company. Development station having apertured thin film for controlling the flow of developer material. 4,716,437, Cl. 355-3.0DD.

MacNeil, Douglas E., to General Dynamics, Pomona Division. Floating seal and method of its use. 4,715,526, Cl. 228-219.000.

Macrander, Max S.: *See*—
Mills, Jeffrey P.; and Macrander, Max S., 4,716,538, Cl. 364-754.000.
Mills, Jeffrey P.; and Macrander, Max S., 4,716,539, Cl. 364-754.000.

Macy, Dennis W., to Colorado State University Research Foundation. Method for detection of exogenous or ACTH stimulated glucocorticoids in domestic animals. 4,716,030, Cl. 424-9.000.

Mage AG: *See*—
Gehring, Manfred; and Pluss, Heinz, 4,715,626, Cl. 285-230.000.

Maggio, Joseph, to Medicore, Inc. Disposable automatic lancet. 4,715,374, Cl. 128-314.000.

MagneTek, Inc.: *See*—
Nolan, Dennis C.; and Bluma, David A., 4,716,348, Cl. 318-479.000.

Magnuson, James M., to Peddinghaus Corporation. Workpiece advancing apparatus. 4,715,774, Cl. 414-751.000.

Magnuson, Robert E., to Lee Controls, Inc. Linear motion pillow blocks including self-aligning features. 4,715,730, Cl. 384-52.000.

Maher, Joseph A.; Vowles, E. John; Napoli, Joseph D.; Zafiropoulo, Arthur W.; and Miller, Mark W., to General Signal Corporation. Quad processor. 4,715,921, Cl. 156-345.000.

Mahoney, Patrick F.: *See*—
Galgana, Russell J.; Mahoney, Patrick F.; and Sutin, Gordon L., 4,715,763, Cl. 414-216.000.

Mahulikar, Deepak, to Olin Corporation. Cermet substrate with glass adhesion component. 4,715,892, Cl. 75-233.000.

Mainelli, Roy J.; and Preston, Donald, to United Technologies Corporation. Fluid flow regulator. 4,715,395, Cl. 138-42.000.

Majerus, Norbert: *See*—
Greenwood, Alan; and Majerus, Norbert, 4,715,577, Cl. 249-107.000.

Makabe, Eiichi; Uesugi, Mitsuaki; Inomata, Masaichi; Maruyama, Kyusuke; Iwai, Kenji; and Sano, Kazuo, to Nippon Kokan Kabushiki Kaisha. Fatigue crack position detection apparatus. 4,716,459, Cl. 358-106.000.

Makal, John: *See*—
Schoenwetter, Randall R.; Makal, John; and Sankey, Edward L., 4,715,104, Cl. 29-271.000.

Makiuchi, Masao, to Fujitsu Limited. Method of producing semiconductor laser. 4,716,125, Cl. 437-22.000.

Malestein, Teus. Apparatus for supplying food to a plurality of cages. 4,715,323, Cl. 119-52.0AF.

Malik, Louis: *See*—
Thuries, Edmond; Masson, Jean-Paul; and Malik, Louis, 4,715,834, Cl. 439-842.000.

Maloney, David C.: *See*—
Perhach, John M.; Porter, Charles E., Jr.; and Maloney, David C., 4,715,215, Cl. 73-49.300.

Malson, Tomas; and Lindqvist, Bengt L., to Pharmacia AB. Gel of crosslinked hyaluronic acid for use as a vitreous humor substitute. 4,716,154, Cl. 514-54.000.

Maltiel, Ron; and Yau, Robert L., to Advanced Micro Devices, Inc. Method and apparatus for non-destructive access of volatile and non-volatile data in a shadow memory array. 4,716,552, Cl. 365-222.000.

Mandigo, Frank N.; and Shapiro, Eugene, to Olin Corporation. Low cost connector alloy. 4,715,910, Cl. 148-414.000.

Mann, Edward D.: *See*—
Whipple, David L.; and Mann, Edward D., 4,716,545, Cl. 364-900.000.

Mann, Joe A.: *See*—
Sanders, John H.; Hoblit, Louis D.; and Mann, Joe A., 4,716,055, Cl. 427-304.000.

Mann, Max; and Kapps, Manfred, to Bergwerksverband GmbH; and Bayer Aktiengesellschaft. Method of strengthening geological formations. 4,715,746, Cl. 405-264.000.

Mann, Steven L. Compound resource recovery furnace. 4,715,299, Cl. 110-235.000.

Manning, Donald L., to Transpec Inc. Energy absorbing vehicle bumper. 4,715,630, Cl. 293-120.000.

Manno, John L.: *See*—
Gallo, Frank G.; Swenson, Clark E.; Bencloski, William A.; Cassette, Angelo J.; Manno, John L.; and Parlak, Edward A., 4,716,010, Cl. 376-260.000.

Manon, C. Dodd: *See*—
Ahearn, John E.; Frates, Raymond A.; Girard, Dennis; Koepke, Richard A.; Schmidt, James K.; and Manon, C. Dodd, 4,716,082, Cl. 428-428.000.

Mansfield Scientific, Inc.: *See*—
Pope, J. Lee, Jr.; and Resden, Ronald E., 4,715,378, Cl. 128-344.000.

Manzelli, Giorgio. Modular element particularly for false ceilings, partition surfaces and non-structural walls. 4,715,158, Cl. 52-581.000.

Marcuvitz, Andrew: *See*—
Douros, Bryan P.; and Marcuvitz, Andrew, 4,716,575, Cl. 375-3.000.

Maresca, Louis M.: *See*—
Clendinning, Robert A.; and Maresca, Louis M., 4,716,211, Cl. 528-126.000.

Margolin, Mark; Grois, Igor; and Moore, James E., to Amphenol Corporation. Fiber optic cable preparation tool and method of preparing fiber optic cable for termination with a fiber optic connector. 4,715,251, Cl. 81-9.400.

Mariusson, Oskar; and Bjarnason, Jon. Water-repellent and vapor-permeable paint. 4,716,188, Cl. 524-268.000.

Markert, Jurgen: *See*—
Hagen, Helmut; Kohler, Rolf-Dieter; Markert, Jurgen; and Wuerzer, Bruno, 4,715,889, Cl. 71-94.000.

Marks, Tobin J.; and Mauermann, Heiko, to Northwestern University. Organolanthanide catalysts. 4,716,257, Cl. 585-275.000.

Markwell, Roger E.; Ward, Robert W.; and de Mello, Carol R., to Beecham Group p.l.c. Certain 7-amino-pyrazolo[4,3-b]pyridines useful in treating inflammatory and allergic disorders. 4,716,160, Cl. 514-212.000.

Maroy, Peter: *See*—
Timar, Tibor; Zsupan, Kalman; Repasi, Janos; Borsos nee Safranek, Iren; Kiss, Istvan; Fodor, Amdras; and Maroy, Peter, 4,716,238, Cl. 549-408.000.

Marquette Electronics, Inc.: *See*—
Cudahy, Michael J.; De La Huerga, Carlos; Arneson, Harold N.; Divers, R. Thomas; and Altman, Barry J., 4,715,385, Cl. 128-710.000.

Marr, Michael R.: *See*—
Burrus, Gilbert S., Jr.; Cooper, Ronald J.; Marr, Michael R.; Pescatore, John C.; and Marsico, Mario A., 4,716,523, Cl. 364-200.000.

Marsico, Mario A.: *See*—
Burrus, Gilbert S., Jr.; Cooper, Ronald J.; Marr, Michael R.; Pescatore, John C.; and Marsico, Mario A., 4,716,523, Cl. 364-200.000.

Martin, George F.: *See*—
Peltz, Curtis L.; Martin, George F.; and Blake, Peter H., 4,716,542, Cl. 364-900.000.

Martin, Henry: *See*—
Lukaszczyk, Alfons; Martin, Henry; Diel, Peter J.; Fory, Werner; Gotzi, Karl; Kristinsson, Haukur; Muller, Beat; Muntwyler, Rene ; Pachlatko, Johannes P.; Rempfler, Hermann; Schurter, Rolf; and Szczepanski, Henry, 4,715,883, Cl. 71-90.000.

Martin Marietta Corporation: *See*—
Nobles, William O., 4,715,566, Cl. 244-159.000.

Martin, Peter G., to National Patent Analytical Systems, Inc. Computer-aided drug-abuse detection. 4,715,386, Cl. 128-733.000.

Maruyama, Kyusuke: *See*—
Makabe, Eiichi; Uesugi, Mitsuaki; Inomata, Masaichi; Maruyama, Kyusuke; Iwai, Kenji; and Sano, Kazuo, 4,716,459, Cl. 358-106.000.

Maruyama, Masanori; Takahashi, Kenji; Kudo, Koji; Hombaugh, Masanori; and Nagahara, Shusaku, to Hitachi, Ltd.; and Hitachi Denshi Kabushiki Kaisha. Apparatus for controlling the electron beam in a television camera tube. 4,716,468, Cl. 358-219.000.

Marx, Hans-Norbert: *See*—
Stanek, Richard; Marx, Hans-Norbert; Hettler, Wendelin; and Wagner, Claus, 4,716,054, Cl. 427-297.000.

Marzolph, Gerhard; Lunkenheimer, Winfried; and Fedtke, Carl, to Bayer Aktiengesellschaft. Herbicidal agents containing photosynthesis-inhibiting herbicides in combination with pyridinecarboxamides. 4,715,888, Cl. 71-93.000.

Masaki, Kazumi, to Hayashibara, Ken. Surge current-limiting circuit. 4,716,511, Cl. 363-49.000.

Maschinen Abrik Rieter AG: *See*—
Erni, Markus; and Salvisberg, Kurt, 4,715,550, Cl. 242-39.000.

Mashimo, Satoshi; Fujita, Kunihiro; Tanaka, Masayuki; Yamaguchi, Yoshio; and Takeda, Kazuhiro, to Mitsuboshi Belting Ltd. Power transmission tensile cord and belt manufacture. 4,715,176, Cl. 57-251.000.

Mashuda, David. Foldable drain hose support. 4,715,570, Cl. 248-49.000.

Masiarz, Frank R.: *See*—
Kuo, George; Masiarz, Frank R.; Truett, Marths; Valenzuela, Pablo; Rasmussen, Mirella E.; and Favaloro, Jennifer, 4,716,117, Cl. 435-240.270.

Mason, Paul B., to Polaroid Corporation. Transparency film assemblage and roller assembly for use therewith. 4,716,092, Cl. 430-209.000.

Massey, Dennis W.: *See*—
Goldstein, Yeshayahu S. A.; Tidman, Derek A.; Burton, Rodney L.; Massey, Dennis W.; and Winsor, Niels K., 4,715,261, Cl. 89-8.000.

Masson, Jean-Paul: *See*—
Thuries, Edmond; Masson, Jean-Paul; and Malik, Louis, 4,715,834, Cl. 439-842.000.

Masson, Ronald K.: *See*—
Thompson, John R.; Hunting, Curtis J.; Masson, Ronald K.; and Trivelpiece, Craig E., 4,716,588, Cl. 380-20.000.

Masters, William E. Variable volume kayak hull. 4,715,311, Cl. 114-347.000.

Masterton, John, to STC PLC. Phase corrector. 4,716,579, Cl. 375-81.000.

Masuch, Peter: *See*—
Langhoff, Josef; Krischke, Hermann; Geldmacher, Horst; Golomb, Manfred; Kamp, Karl-Heinz; Masuch, Peter; and Chalupnik, Rolf, 4,715,809, Cl. 431-170.000.

Masuda, Senichi; and Sugita, Naoki, to Masuda, Senichi. Electrostatic filter dust collector. 4,715,870, Cl. 55-132.000.

Masuda, Toru: *See*—
Iwasa, Yoshihiro; Masuda, Toru; and Shibano, Yasuji, 4,715,819, Cl. 439-31.000.

Masuhara, Hiromu; and Kimura, Tsunekazu, to NEC Corporation. Error correcting system. 4,716,566, Cl. 371-37.000.

Masuzawa, Sigeaki; Shibata, Shinya; Miyazaki, Hiroshi; and Iwase, Tetsuo, to Sharp Kabushiki Kaisha. Speech synthesis method and device. 4,716,591, Cl. 381-51.000.

Mathes, Gene R.: *See*—
Amacher, Gene L.; Mathes, Gene R.; Paugstat, John F.; and Mergenthaler, Barry M., 4,715,457, Cl. 177-1.000.
Amacher, Gene L.; Mathes, Gene R.; Paugstat, John F.; and Mergenthaler, Barry M., 4,716,281, Cl. 235-383.000.

Matlock, Dyer A.: *See*—
Roberts, Bruce E.; Black, Jimmy C.; and Matlock, Dyer A., 4,716,071, Cl. 428-209.000.

Matsuda, Kenji: *See*—
Umemura, Hiroyuki; Matsuda, Kenji; Tezuda, Tomofumi; Isono, Kazuaki; Ishioka, Hidenori; Sugawara, Sakuo; and Hara, Masanori, 4,715,191, Cl. 62-208.000.

Matsugi, Tetsuzo: *See*—
Inaba, Tsutomu; Kimura, Tadashi; Kobayashi, Norihide; Sugihara, Masahiro; and Matsugi, Tetsuzo, 4,715,796, Cl. 418-55.000.

Matsui, Hideo; Fujie, Hiroshi; and Noma, Takashi, to Teijin Limited. Compression moldable aromatic polyamide powder. 4,716,215, Cl. 528-348.000.

Matsui, Kazuma: *See*—
Hattori, Yoshiyuki; Matsui, Kazuma; Imani, Yuichi; Kuno, Akira; Nagata, Tetsuya; Nakane, Koji; and Nomura, Ken, 4,715,663, Cl. 303-110.000.

Matsui, Sadayoshi: *See*—
Taneya, Mototaka; Matsui, Sadayoshi; and Matsumoto, Mitsuhiro, 4,716,129, Cl. 437-96.000.
Yoshida, Toshihiko; Takiguchi, Haruhisa; Kaneiwa, Shinji; and Matsui, Sadayoshi, 4,716,570, Cl. 372-45.000.

Matsui, Shigeru: *See*—
Sekihara, Kensuke; Matsui, Shigeru; Kohno, Hideki; Yamamoto, Etsuji; and Shiono, Hidemi, 4,716,369, Cl. 324-309.000.

Matsui, Toshiya, to NEC Corporation. Multivoice signal switching circuit. 4,716,589, Cl. 381-3.000.

Matsumoto, Koichi: *See*—
Kameyama, Masaomi; and Matsumoto, Koichi, 4,715,318, Cl. 118-722.000.

Matsumoto, Mitsuhiro: *See*—
Taneya, Mototaka; Matsui, Sadayoshi; and Matsumoto, Mitsuhiro, 4,716,129, Cl. 437-96.000.

Matsumoto, Yukimichi, to Kabushiki Kaisha Fuji Tekkosho. Multispindle winder. 4,715,552, Cl. 242-56.00A.

Matsunuma, Tamotsu: *See*—
Kawasaki, Kiyohito; Sato, Michitaka; Koseki, Hiroyuki; and Matsunuma, Tamotsu, 4,715,419, Cl. 152-527.000.

Matsuo, Kenji; Sasaki, Itsuo; Suzuki, Hiroaki; and Kunieda, Mitsuyuki, to Tokyo Shibaura Denki Kabushiki Kaisha. MOS pull-up or pull-down logic circuit having equalized discharge time delays and layout avoiding crossovers. 4,716,308, Cl. 307-303.000.

Matsuo, Satoshi, to Kabushiki Kaisha Toshiba. Electronic endoscopic system. 4,716,457, Cl. 358-98.000.

Matsuo, Yukito, to Kabushiki Kaisha Toshiba. Conveying apparatus. 4,716,346, Cl. 318-38.000.

Matsuoka, Akio: *See*—
Nishizawa, Kazutoshi; Takagi, Masashi; and Matsuoka, Akio, 4,715,792, Cl. 417-295.000.
Nishizawa, Kazutoshi; Takagi, Masashi; Matsuoka, Akio; and Nomura, Fuzio, 4,715,800, Cl. 418-69.000.

Matsuoka, Noriyuki, to Yamaichi Electric Mfg. Co., Ltd. IC package carrier. 4,715,835, Cl. 439-893.000.

Matsuoka, Yoshio: *See*—
Ishii, Katsumi; Hirayama, Kanae; Matsuoka, Yoshio; and Takahashi, Kotei, 4,715,466, Cl. 180-233.000.

Matsushita Electric Industrial Co., Ltd.: *See*—
Hamada, Ken; Wada, Masaru; and Itoh, Kunio, 4,716,571, Cl. 372-48.000.
Jiko, Hideyasu; and Hayashi, Tomoyuki, 4,716,378, Cl. 330-108.000.
Kawaguchi, Takao; Adachi, Hideaki; Setsune, Kentaro; Ohji, Kenzo; and Wasa, Kiyotaka, 4,715,680, Cl. 350-96.340.
Ogawa, Kazufumi, 4,715,929, Cl. 156-643.000.
Ogawa, Kazufumi, 4,716,441, Cl. 355-30.000.
Sakamoto, Hiroshi; Torigoe, Toshihiro; and Yamaguchi, Tadashi, 4,716,291, Cl. 250-318.000.
Tanaka, Hiroyoshi; Adachi, Masaaki; Tsuda, Yoshiyuki; Ando, Toshiaki; Nishiwaki, Humitoshi; and Aoyama, Shigeo, 4,715,437, Cl. 165-151.000.

Matsushita Electric Works, Ltd.: *See*—
Kagawa, Hirohiko; Kyotani, Yasuhiro; and Torii, Munetomo, 4,716,184, Cl. 523-310.000.
Nakano, Kunimitsu; and Onishi, Hiroyuki, 4,716,392, Cl. 335-189.000.

Matsushita Electrical Industrial Co., Ltd.: *See*—
Kaminaka, Nobuyuki; and Yoshida, Yasuo, 4,716,484, Cl. 360-125.000.

Matsuura, Ryoichi: *See*—
Otsuki, Hiromi; Numata, Kenichi; Matsuura, Ryoichi; Nomura, Yoshihisa; Nakanishi, Nobuyasu; and Oka, Hiroyuki, 4,715,667, Cl. 303-119.000.

Matsuura, Takeshi: *See*—
Morioka, Akira; Matsuura, Takeshi; and Takahira, Yoshiyuki, 4,716,076, Cl. 428-323.000.

Matsuzawa, Shigemitsu: *See*—
Ito, Takashi; Matsuzawa, Shigemitsu; and Kato, Katsuaki, 4,716,087, Cl. 429-40.000.

Mattel, Inc.: *See*—
Ostendorff, Eric C.; and Tucker, James I., Jr., 4,715,843, Cl. 446-429.000.

Matthias, William T.: *See*—
Koek, Kevin C.; Matthias, William T.; and Barton, James T., 4,715,682, Cl. 350-253.000.

Matthiessen, Robert E.: *See*—
Holt, Alyn R.; and Matthiessen, Robert E., 4,715,374, Cl. 248-297.100.

Mauermann, Heiko: *See*—
Marks, Tobin J.; and Mauermann, Heiko, 4,716,257, Cl. 585-275.000.

Mauldin, Donald M.; and Jones, Richard E., III. Passive mobilizer. 4,715,361, Cl. 128-52.000.

May, Richard L.; Smith, Jay; and Wolf, Harley, to May, Richard L.; and Curran, Kennth. Racing game apparatus. 4,715,602, Cl. 273-86.00R.

Mayer, Hans: *See*—
Essig, Willi; Kicherer, Robert; and Mayer, Hans, 4,715,569, Cl. 248-27.100.

Mazda Motor Corporation: *See*—
Kanayama, Hideaki, 4,715,772, Cl. 414-730.000.
Kijima, Takao; and Ando, Fumitaka, 4,715,614, Cl. 280-701.000.
Kijima, Takao; and Ando, Fumitaka, 4,715,615, Cl. 280-701.000.

Mazzocco, Thomas R.; and Frenchik, Mary T. Devices for implantation of deformable intraocular lens structures. 4,715,373, Cl. 128-303.00R.

McAdams, Hugh P., to Texas Instruments Incorporated. CMOS sense amplifier with isolated sensing nodes. 4,716,320, Cl. 307-530.000.

McBride, Edward F.: *See*—
Bellis, Harold E.; and McBride, Edward F., 4,715,967, Cl. 252-8.551.

McCaffrey, John T., to Perkin-Elmer Corporation, The. Power circuit for spectral analysis gaseous discharge lamps. 4,716,342, Cl. 315-219.000.

McCauley, Porter T.: *See*—
Wolff, Donald L.; McCauley, Porter T.; Stiefel, Paul; Takacs, Gyoergy J.; and Adams, Roman A., 4,715,786, Cl. 417-22.000.

McChristian, Robert L., Jr. Dual mode fishing reel assembly. 4,715,555, Cl. 242-84.50R.

McClung, James A.: *See*—
Bulso, Joseph D., Jr.; and McClung, James A., 4,715,208, Cl. 72-348.000.

McComsey, Lee E.: *See*—
Teng, Chuan C.; Chapelle, Rene A.; Blacklaws, John E.; and McComsey, Lee E., 4,715,454, Cl. 175-299.000.

McConnell, Ronald F., to Du Pont de Nemours, E. I., and Company. Apparatus for forming a web. 4,715,924, Cl. 156-433.000.

McCormack, Gary D.: *See*—
Davenport, William H.; McCormack, Gary D.; and LaRue, George S., 4,716,311, Cl. 307-448.000.

McCormick, Mary D. Pacifier. 4,715,379, Cl. 128-360.000.

McCulloch, Alister L. Fire extinguisher outlet head. 4,715,448, Cl. 169-62.000.

McDaniel, Ernie C.: *See*—
Reynolds, Albert H., III; McDaniel, Ernie C.; and Juhala, Roland E., 4,715,707, Cl. 356-28.500.

McDonnell Douglas Corporation: *See*—
Reynolds, Albert H., III; McDaniel, Ernie C.; and Juhala, Roland E., 4,715,707, Cl. 356-28.500.

McDonnell Douglas Helicopter Co.: *See*—
Kramer, S. Bertram; and Sampatacos, Evan P., 4,715,263, Cl. 89-37.210.

McDonough, William: *See*—
Hart, Edward F.; and McDonough, William, 4,716,409, Cl. 340-825.220.

McEntee, Timothy J.: *See*—
Oxley, Donald W.; Bartley, David H.; and McEntee, Timothy J., 4,716,524, Cl. 364-200.000.

McGill Incorporated: *See*—
Kennedy, Paul E., 4,715,868, Cl. 55-48.000.

McGready, Angus J., to Wilkinson Sword Limited. Razors, and shaving units for razors. 4,715,120, Cl. 30-57.000.

McGreehan, William F.; and Sherwood, Laurence T., to General Electric Company. Flow measurement system. 4,715,213, Cl. 73-40.700.

McGunnigle, Roger J., to FWM Enterprises, Inc., a part interest. Process for determining optimum keyboard formats for a given language. 4,715,736, Cl. 400-484.000.

McKee, J. Ward. Adjustable motorcycle muffler. 4,715,472, Cl. 181-241.000.

McKee, John M.; and Ranalletta, Joseph V. Indicator light assembly with fluorescent lens. 4,716,501, Cl. 362-31.000.

McLaren, Kevin W., to Johnsen & Jorgensen Plastics Limited. Tamper resistant closures. 4,715,506, Cl. 215-252.000.

McLaughlin, John J. Underlying pad for attaching removable automobile carpet. 4,716,065, Cl. 428-95.000.

McLeod, Angus I.: *See*—
Juhasz, Laszlo; and McLeod, Angus I., 4,715,857, Cl. 604-359.000.

McLoughlin, Bernard J.: *See*—
Hargreaves, Rodney B.; McLoughlin, Bernard J.; and Mills, Stuart D., 4,716,164, Cl. 514-242.000.

McManigal, David F.: *See*—
Beausoleil, William F.; and McManigal, David F., 4,716,546, Cl. 364-900.000.

McNally, Guy W. W. Variable speed replay of digital audio with constant output sampling rate. 4,716,472, Cl. 360-8.000.

McNeilab, Inc.: *See*—
Carmosin, Richard J.; and Carson, John R., 4,716,172, Cl. 514-306.000.
Epps, Joyce E.; Ng, Kung-Tat; Tuman, Robert W.; and Wu, Wu-Nan, 4,716,163, Cl. 514-237.000.

McQueston, James C.: *See*—
Pavlick, Michael J.; McQueston, James C.; Eggert, Walter S., Jr.; and Sherrow, Lionel, 4,715,292, Cl. 105-456.000.

McVey, Kenneth. Receiving and lifting device for ground or floor objects. 4,715,632, Cl. 294-19.100.

Mead, Carver A.; and Wawrzynek, John C., to California Institute of Technology. CMOS logic circuit. 4,716,312, Cl. 307-475.000.

Mead, John A.: *See*—
Greene, Orville T., Jr.; and Mead, John A., 4,715,696, Cl. 350-500.000.

Measurex Corporation: *See*—
Howarth, John; and Alguard, Mark, 4,715,715, Cl. 356-402.000.

Medicore, Inc.: *See*—
Maggio, Joseph, 4,715,374, Cl. 128-314.000.

Meijer, Roelf J.; and Ziph, Benjamin, to Stirling Thermal Motors, Inc. Dual source external heating system for a heat pipe. 4,715,183, Cl. 60-524.000.

Meister, Hans U.: *See*—
Ruegg, Christoph; Voirol, Peter; Fuchs, Willi; and Meister, Hans U., 4,715,739, Cl. 403-30.000.

Meixner, Hans: *See*—
Pettke, Felix; Siwon, Hans; and Meixner, Hans, 4,716,294, Cl. 250-353.000.

Mendoza, Fausto C. System for preparing tortillas. 4,715,272, Cl. 99-339.000.

Menon, Vinod; and Kaku, Shinkyo, to Advanced Micro Devices, Inc. Speed-up method and apparatus for two-dimensional facsimile coding and decoding. 4,716,467, Cl. 358-260.000.

Menz, Hans-Udo: *See*—
Biernoth, Gerhard; Menz, Hans-Udo; Todt, Klaus H.; and Wieske, Theophil, 4,716,047, Cl. 426-603.000.

Merck & Co., Inc.: *See*—
Parsons, William H.; Schoen, William R.; Patchett, Arthur A.; and Taniguchi, Masao, 4,715,994, Cl. 260-502.50E.
Reinhold, Donald F.; Utne, Torleif; and Abramson, Newton L., 4,716,246, Cl. 562-446.000.

Merck Patent Gesellschaft mit beschrankter Haftung: *See*—
Krause, Joachim; Wachtler; and Scheuble, Bernhard, 4,715,984, Cl. 252-299.610.

Mergenthaler, Barry M.: *See*—
Amacher, Gene L.; Mathes, Gene R.; Paugstat, John F.; and Mergenthaler, Barry M., 4,715,457, Cl. 177-1.000.
Amacher, Gene L.; Mathes, Gene R.; Paugstat, John F.; and Mergenthaler, Barry M., 4,716,281, Cl. 235-383.000.

Merkovsky, Daniel; and Gasparro, Michael R., to Westinghouse Electric Corp. Thimble guide extender. 4,716,004, Cl. 376-203.000.

Merrien, Pierre A.: *See*—
Merrien, Pierre L.; and Merrien, Pierre A., 4,715,427, Cl. 164-456.000.

Merrien, Pierre L.; and Merrien, Pierre A., to Etude et Development en Metallurgie. Process and apparatus for automating a baking cycle under hot air of sand molds. 4,715,427, Cl. 164-456.000.

Merten, Gerhard: *See*—
Rassmann, Christoph; Nickel, Gerhard; Steinkuhl, Bernd; Merten, Gerhard; and Pfefferle, Egon, 4,715,659, Cl. 299-43.000.

Merz, Eckhard: *See*—
Heitzenroder, Hans; and Merz, Eckhard, 4,715,494, Cl. 206-213.100.

Messerschmitt-Boelkow-Blohm Gesellschaft mit beschraenkter Haftung: *See*—
Soltow, Uwe; Guthke, Hans-Peter; Plate, Hans-Georg; Lechner, Johann; and Kirma, Safa, 4,715,571, Cl. 248-68.100.
Woerndle, Rudolf, 4,715,589, Cl. 267-148.000.

Metal Box p.l.c.: *See*—
Middleton, Nicholas J., 4,715,913, Cl. 156-85.000.

Metrohm AG: *See*—
Kaempf, Karl; Zaehner, Paul; and Richter, Wolfgang, 4,715,237, Cl. 73-864.620.

Metrosky, John J.: *See*—
Raymond, Dean; and Metrosky, John J., 4,715,599, Cl. 273-15.00R.

Metz, Hans J., to Hoechst Aktiengesellschaft. Process for the preparation of alkali metal and alkaline earth salts of benzaldehyde-2,4-disulfonic acid. 4,715,995, Cl. 260-511.000.

Metzger, Karl G.: *See*—
Kruger, Bernd-Wieland; Lockhoff, Oswald; Metzger, Karl G.; Opitz, Hans-Georg; Schaller, Klaus; Stunkel, Klaus G.; and Zeiler, Hans-Joachim, 4,716,152, Cl. 514-25.000.

Meyer, Peter. Device for wireless video monitoring and control of a still camera. 4,716,465, Cl. 358-210.000.

Mezaki, Masakazu: *See*—
Sano, Fumikazu; and Mezaki, Masakazu, 4,716,079, Cl. 428-383.000.

Mi-Jack Products, Inc.: *See*—
Lanigan, John J., Sr.; Glickman, Myron; George, Thazhuthekudiyil V.; and Ermel, Bernard A., 4,715,762, Cl. 414-126.000.

Michalski, Dennis H.: *See*—
Gruber, James R.; Gudath, Ernest A.; Michalski, Dennis H.; Riddle, Robert R.; and Stana, Regis R., 4,716,026, Cl. 423-167.000.

Micro Research, Inc.: *See*—
Newell, Darrel E.; and O'Brien, Mary C., 4,716,344, Cl. 315-312.000.

Microlife Technics, Inc.: *See*—
Gonzalez, Carlos F.; and Gryczka, Alfred J., 4,716,115, Cl. 435-172.300.

Middleton, Nicholas J., to Metal Box p.l.c. Decorating substrate materials. 4,715,913, Cl. 156-85.000.

Miesak, Edward J. Optical transmission link for musical production. 4,715,671, Cl. 350-96.100.

Migliore-Samour, Daniele: *See*—
Jolles, Pierre; Migliore-Samour, Daniele; and Parker, Fabienne, 4,716,151, Cl. 514-18.000.

Miida, Takashi; Takei, Akira; and Tashiro, Kiyoshi, to Fujitsu Limited. Image sensor. 4,716,466, Cl. 358-213.260.

Mikhail, Ameer G. Postal stamp with provisions for entering machine readable destination identifier. 4,715,622, Cl. 283-71.000.

Miki, Hajime, to Japan Tobacco Inc. Apparatus for selectively removing tobacco plant leaves. 4,715,170, Cl. 56-27.500.

Milenkovic, Veljko: *See*—
Huang, Bernard; and Milenkovic, Veljko, 4,716,350, Cl. 318-568.000.

Miles Laboratories, Inc.: *See*—
Ward, Frederick E.; and Yip, Kin F., 4,716,236, Cl. 548-556.000.

Millay, Lawrence I.; and Bourgoine, Edward, to Ex-Cell-O Corporation. In-process gaging equipment for flexible grinding cells. 4,715,147, Cl. 51-165.710.

Miller, David A. B., to American Telephone and Telegraph Company AT&T Bell Laboratories. Nonlinear and bistable optical device. 4,716,449, Cl. 357-30.000.

Miller, James C.: *See*—
Horvath, Joseph G.; and Miller, James C., 4,716,487, Cl. 361-42.000.

Miller, Mark W.: *See*—
Maher, Joseph A.; Vowles, E. John; Napoli, Joseph D.; Zafiropoulo, Arthur W.; and Miller, Mark W., 4,715,921, Cl. 156-345.000.

Miller, Ronald W.: *See*—
Blank, Robert G.; and Miller, Ronald W., 4,716,042, Cl. 424-474.000.

Miller, Wayne A.: *See*—
Tveter, Richard S.; and Miller, Wayne A., 4,715,214, Cl. 73-49.200.

Miller, Werner: *See*—
Hoppe, Hans; Heep, Dieter; Eberhard, Norbert; and Miller, Werner, 4,715,749, Cl. 406-14.000.

Millot, Jean-Paul: *See*—
Leroy, Claude; Millot, Jean-Paul; and Desfontaines, Guy, 4,716,008, Cl. 376-237.000.

Mills, Jeffrey P.; and Macrander, Max S., to GTE Communication Systems Corporation. Multiply/divide circuit for encoder PCM samples. 4,716,538, Cl. 364-754.000.

Mills, Jeffrey P.; and Macrander, Max S., to GTE Communication Systems Corporation. Multiplier circuit for encoder PCM samples. 4,716,539, Cl. 364-754.000.

Mills, Stuart D.: *See*—
Hargreaves, Rodney B.; McLoughlin, Bernard J.; and Mills, Stuart D., 4,716,164, Cl. 514-242.000.

Mimoto, Toshio, to Sharp Kabushiki Kaisha. MOS IC pull-up circuit. 4,716,303, Cl. 307-264.000.

Mimura, Itaru: *See*—
Ozawa, Naoki; Akiyama, Toshiyuki; Satoh, Kazuhiro; Nagahara, Syusaku; and Mimura, Itaru, 4,716,453, Cl. 358-44.000.

Minami, Nagio: *See*—
Fukaya, Yasuhiro; and Minami, Nagio, 4,715,524, Cl. 228-165.000.

Minami, Takao; Nagano, Hiroo; Yamanaka, Kazuo; Okada, Yasutaka; Susukida, Hiroshi; Onimura, Kichiro; Yonezawa, Toshio; and Sasaguri, Nobuya, to Mitsubishi Jukogyo Kabushiki Kaisha; and Sumitomo Metal Industries, Ltd. Nickel-chromium alloy in stress corrosion cracking resistance. 4,715,909, Cl. 148-410.000.

Minnesota Mining and Manufacturing Company: *See*—
Strand, Jerome E., 4,715,382, Cl. 128-640.000.
Tsay, Yuh-Geng; Beigler, Myron A.; Calenoff, Emanuel; Friesen, Gerald L.; and Nichols, James L., 4,716,120, Cl. 436-513.000.

Mino, Kaoru; Fukushima, Koji; and Kasai, Takashi, to Diesel Kiki Co., Ltd. Seal element for sealing ducts of an air conditioner system. 4,715,609, Cl. 277-207.00R.

Minolta Camera Kabushiki Kaisha: *See*—
Bartley, George S., 4,716,544, Cl. 364-900.000.
Taniguchi, Nobuyuki; Ishida, Tokuji; Hamada, Masataka; Karasaki, Toshihiko; and Norita, Toshio, 4,716,434, Cl. 354-408.000.

Minonishi, Kuniaki; and Sato, Reijiro, to Asahi Kasei Kogyo Kabushiki Kaisha. Photosensitive resin composition which is improved with respect to surface tack-free characteristic after curing, and a method. 4,716,094, Cl. 430-284.000.

Minoru, Ishida. Two-speed drive mechanism for toys. 4,715,475, Cl. 185-39.000.

Mis, Katherine H.: *See*—
Arnold, Allen J.; Courtney, Mark G.; Kirby, Diane N.; Mis, Katherine H.; and Sutton, Kerry L., 4,715,430, Cl. 165-80.300.

Misawa, Isao. Display apparatus for single-lens reflex camera. 4,716,429, Cl. 354-409.000.

Mishima, Masayuki, to Research Dev. Corp. of Japan; and Kao Corporation. Urea adsorbent. 4,715,961, Cl. 210-692.000.

Misselhorn, Klaus; and Tegtmeier, Uwe. Method to separate polar organic compounds, in particular alihatic alcohols, from fermentation fluids. 4,715,932, Cl. 203-43.000.

Mita, Yoshinori: *See*—
Takahashi, Shinji; and Mita, Yoshinori, 4,715,465, Cl. 180-225.000.

Mitchell, Edward: *See*—
Snyder, Thomas S.; Burgman, Herbert A.; and Mitchell, Edward, 4,715,992, Cl. 252-628.000.

Mitchell, Hal D.; and Walker, Donald R., to Figgie International Inc. Shoulder pad. 4,715,066, Cl. 2-2.000.

Mitsubishi Chemical Industries Limited: *See*—
Fukami, Harukazu; Kikumoto, Ryoji; Nakao, Kenichiro; Nitta, Issei; and Inoue, Shinya, 4,716,161, Cl. 514-222.000.
Oguri, Yasuo; Saito, Junji; and Kijima, Naoto, 4,716,029, Cl. 423-625.000.

Mitsubishi Denki Kabushiki Kaisha: *See*—
Fujii, Hiroshi; Iio, Tsukasa; Genba, Yasusi; Moriwaki, Hideaki; and Mochizuki, Yoshinori, 4,716,265, Cl. 200-144.00R.
Hine, Shiro, 4,716,559, Cl. 369-112.000.
Inaba, Tsutomu; Kimura, Tadashi; Kobayashi, Norihide; Suginara, Masahiro; and Matsugi, Tetsuzo, 4,715,796, Cl. 418-55.000.
Ito, Tomotaka, 4,716,513, Cl. 363-97.000.
Iwata, Shigemi, 4,716,517, Cl. 364-145.000.
Koyokawa, Morio; and Fujimoto, Akihiko, 4,716,349, Cl. 318-562.000.
Morishita, Akira; Okamoto, Kyoithi; Gotoh, Toshihiko; Kako, Yukio; and Arima, Takemi, 4,715,243, Cl. 74-434.000.
Morishita, Mitsuharu; and Kouge, Shinichi, 4,716,355, Cl. 320-64.000.
Sakamoto, Yuzo; and Koike, Kazuo, 4,716,479, Cl. 360-105.000.
Ueda, Yoshihiro; Ono, Kouichi; Oomori, Tatsuo; and Fujita, Shigeto, 4,716,295, Cl. 250-423.00P.
Umemura, Hiroyuki; Matsuda, Kenji; Tezuda, Tomofumi; Isono, Kazuaki; Ishioka, Hidenori; Sugawara, Sakuo; and Hara, Masanori, 4,715,191, Cl. 62-208.000.
Yoshida, Koichi; and Kawai, Joji, 4,716,535, Cl. 364-565.000.

Mitsubishi Jukogyo Kabushiki Kaisha: *See*—
Fukaya, Yasuhiro; and Minami, Nagio, 4,715,524, Cl. 228-165.000.
Katayama, Kazuso; Ichiryu, Taku; Mitsuhashi, Tsuneyoshi; Mori, Yasushi; and Kobayashi, Masanori, 4,715,778, Cl. 415-104.000.
Minami, Takao; Nagano, Hiroo; Yamanaka, Kazuo; Okada, Yasutaka; Susukida, Hiroshi; Onimura, Kichiro; Yonezawa, Toshio; and Sasaguri, Nobuya, 4,715,909, Cl. 148-410.000.
Oura, Masayuki, 4,715,752, Cl. 409-232.000.

Mitsubishi Mining and Cement Co., Ltd.: *See*—
Yamaguchi, Takashi; Ishiguchi, Isao; and Inoue, Takeshi, 4,716,134, Cl. 501-136.000.

Mitsubishi Petrochemical Co., Ltd.: *See*—
Mori, Shoichiro; and Ue, Makoto, 4,715,976, Cl. 252-62.200.

Mitsuboshi Belting Ltd.: *See*—
Mashimo, Satoshi; Fujita, Kunihiro; Tanaka, Masayuki; Yamaguchi, Yoshio; and Takeda, Kazuhiro, 4,715,176, Cl. 57-251.000.

Mitsuhashi, Tsuneyoshi: *See*—
Katayama, Kazuso; Ichiryu, Taku; Mitsuhashi, Tsuneyoshi; Mori, Yasushi; and Kobayashi, Masanori, 4,715,778, Cl. 415-104.000.

Mitsui Sekitan Kogyo Kabushiki Kaisha: *See*—
Sato, Koji; Kuroda, Hiroshi; Yamada, Ryuji; and Serino, Mamoru, 4,715,657, Cl. 299-1.000.

Miwa, Naoto: *See*—
Hori, Makoto; Nagaya, Toshiatsu; Mukai, Hirokatsu; Niwa, Hitoshi; and Miwa, Naoto, 4,716,279, Cl. 219-541.000.

Miyagawa, Toshihito: *See*—
Katsumoto, Naoaki; and Miyagawa, Toshihito, 4,715,655, Cl. 297-362.000.

Miyake, Hiroshi, to Daihatsu Motor Company Limited. Fuel-injection nozzle. 4,715,540, Cl. 239-533.300.

Miyake, Yuzuru; Nohara, Isao; Sugioka, Takami; Onishi, Susumu; and Ueno, Toshiyuki, to Teijin Seiki Co., Ltd. Spindle drive type yarn winding apparatus. 4,715,548, Cl. 242-18.00R.

Miyamoto, Masao: *See*—
Ishimaru, Hajime; Miyamoto, Masao; and Komaki, Shojiro, 4,715,186, Cl. 62-45.000.

Miyata, Osamu: *See*—
Hasegawa, Yoshihiko; and Miyata, Osamu, 4,715,225, Cl. 73-215.000.

Miyazaki, Hiroshi: *See*—
Masuzawa, Sigeaki; Shibata, Shinya; Miyazaki, Hiroshi; and Iwase, Tetsuo, 4,716,591, Cl. 381-51.000.

Miyazaki, Makoto: *See*—
Fujita, Masahito; Kizaki, Masami; Miyazaki, Makoto; and Inaba, Naomi, 4,716,206, Cl. 526-139.000.

Miyazaki, Shinji: *See*—
Ito, Takaaki; Mori, Eiji; Uranishi, Koji; Miyazaki, Shinji; and Sugimoto, Junichi, 4,715,509, Cl. 220-86.00R.

Miyazaki, Yasuyuki: *See*—
Ogawa, Hiroshi; Miyazaki, Yasuyuki; Yoshida, Susumu; and Sasaki, Shinichi, 4,716,530, Cl. 364-424.000.

Miyoshi, Shoji; and Nomura, Ryuichi, to Toyo Rubber Industry Co., Ltd. Pneumatic tires having high uniformity. 4,715,418, Cl. 152-451.000.

Mizuuchi, Kiyoshi; Mizuuchi, Michiyo; and Adachi, Toshiro, to United States of America, Health and Human Services. Mini Mu containing plasmid and a method for rapid DNA sequencing. 4,716,105, Cl. 435-5.000.

Mizuuchi, Michiyo: *See*—
Mizuuchi, Kiyoshi; Mizuuchi, Michiyo; and Adachi, Toshiro, 4,716,105, Cl. 435-5.000.

Moberg, Lennart, to Siemens Aktiengesellschaft. Battery test circuit for a heart pacemaker. 4,715,381, Cl. 128-419.0PT.

Mobil Oil Corporation: *See*—
Canterino, Peter J.; Dobreski, David V.; and Shaw, Richard G., 4,716,201, Cl. 525-240.000.
Chen, Catherine S. H., 4,716,135, Cl. 502-62.000.
Farng, Liehpao O.; and Horodysky, Andrew G., 4,715,974, Cl. 252-46.400.
Weisz, Paul B.; and Yan, Tsoung Y., 4,716,136, Cl. 502-64.000.

Mobley, Dewey F.; and Warren, Janice M., to Interlock Corporation. Pin and socket electrical terminal. 4,715,833, Cl. 439-834.000.

Mochizuki, Tohru, to Kabushiki Kaisha Toshiba. Semiconductor memory cell. 4,716,548, Cl. 365-149.000.

Mochizuki, Yoshinori: *See*—
Fujii, Hiroshi; Iio, Tsukasa; Genba, Yasusi; Moriwaki, Hideaki; and Mochizuki, Yoshinori, 4,716,265, Cl. 200-144.00R.

Moermann, Renate: *See*—
Gollub, Hans J.; Hechenberger, Dieter A.; and Moermann, Renate, 4,716,189, Cl. 524-284.000.

Mogelof, Andrew. Adjustable dental wedging system. 4,715,816, Cl. 433-149.000.

Mogensen, Palne. Method and means for applying a heat exchanger in a drill hole for the purpose of heat recovery or storage. 4,715,429, Cl. 165-45.000.

Moisala, Tapio; and Gustafsson, Jukka, to AGA Aktiebolag; and Oy Partek AB. Apparatuses in the manufacture of mineral wool. 4,715,877, Cl. 65-15.000.

Moji, Yukimori; and Taylor, Richard Q., to Boeing Company, The. Honeycomb core structure with embedded fastener. 4,716,067, Cl. 428-117.000.

Monarch Marking Systems, Inc.: *See*—
Strausburg, Larry D., 4,715,521, Cl. 227-67.000.

Moncalvo, Agostino: *See*—
Fausone, Alfredo; and Moncalvo, Agostino, 4,716,587, Cl. 380-10.000.

Mongeon, Robert J.; Wayne, Robert J.; and Henschke, Robert W., to United States of America, Army. Optical radar transceiver control apparatus. 4,716,444, Cl. 356-05.000.

Monsanto Company: *See*—
Hilton, Glenn B.; and Robertson, Wayne W., 4,716,196, Cl. 525-72.000.
Tjoeng, Foe S.; Fok, Kam F.; and Adams, Steven P., 4,716,147, Cl. 514-11.000.

Montagna, Angelo A.: *See*—
Jacobson, Allan J.; Ho, Teh C.; Chianelli, Russell R.; Steger, John J.; and Montagna, Angelo A., 4,716,139, Cl. 502-167.000.

Monte, Salvatore J.: *See*—
Sugerman, Gerald; and Monte, Salvatore J., 4,715,968, Cl. 252-8.600.

Montedison S.p.A.: *See*—
Capizzi, Amedeo; Spinelli, Pia; and Arsura, Emilio, 4,715,536, Cl. 239-54.000.

Montgomery, Raymond M.: *See*—
Johanson, Robert H.; Montgomery, Raymond M.; Herndon, Michael T.; and Peterson, Edward C., 4,715,086, Cl. 15-339.000.

Montierth, Max R., to Corning Glass Works. Apparatus for forming a flexible mask. 4,715,576, Cl. 249-60.000.

Montierth, Max R., to Corning Glass Works. Apparatus for high speed manifolding of honeycomb structures. 4,715,801, Cl. 425-110.000.

Montijo, James K. Flotation pool blanket. 4,715,070, Cl. 4-498.000.

Moore Business Forms, Inc.: *See*—
Leese, David J.; and Ashby, Robert E., 4,715,530, Cl. 229-73.000.

Moore, David G., to Realex Corporation. Dispenser for striped viscous products. 4,715,518, Cl. 222-257.000.

Moore, James E.: *See*—
Margolin, Mark; Grois, Igor; and Moore, James E., 4,715,251, Cl. 81-9.400.

Moore, Jeffrey E.; Evans, Brett A.; and Hansen, Richard, to Procter & Gamble Company, The. Granular detergent compositions having improved solubility. 4,715,979, Cl. 252-91.000.

Moores, Ralph J.: *See*—
Gnanamuthu, Daniel S.; Moores, Ralph J.; Paton, Neil E.; and Vyhna, Richard F., 4,716,270, Cl. 219-121.0LM.

Moosmann, Horst: *See*—
Dinger, Horst; and Moosmann, Horst, 4,715,281, Cl. 102-216.000.

Morel, Frederic: *See*—
Le Page, Jean-Francois; Billon, Alain; Morel, Frederic; Renard, Pierre; Biedermann, Jean-Michel; Laborde, Michel; and Bousquet, Jacques, 4,715,946, Cl. 208-45.000.

Morell, Josef; Freudenschuss, Otto; and Schmidt, Harald, to Steyr-Daimler-Puch AG. Fuel injection nozzle for internal combustion engines. 4,715,542, Cl. 239-533.900.

Mori, Eiji: *See*—
Ito, Takaaki; Mori, Eiji; Uranishi, Koji; Miyazaki, Shinji; and Sugimoto, Junichi, 4,715,509, Cl. 220-86.00R.

Mori, Shoichiro; and Ue, Makoto, to Mitsubishi Petrochemical Co., Ltd. Electrolyte solution for electrolytic capacitor. 4,715,976, Cl. 252-62.200.

Mori, Shosuke; Sakurai, Atsushi; Aoki, Satoshi; and Suzuki, Tatsuya, to Fujitsu Limited. Multiprocessor system. 4,716,526, Cl. 364-200.000.

Mori, Tetsuzo: *See*—
Ozawa, Kunitaka; Nakamura, Takashi; Katayama, Akira; Hatanaka, Katsunori; Mori, Tetsuzo; and Takaoka, Makoto, 4,716,421, Cl. 346-140.00R.

Mori, Yasushi: *See*—
Katayama, Kazuso; Ichiryu, Taku; Mitsuhashi, Tsuneyoshi; Mori, Yasushi; and Kobayashi, Masanori, 4,715,778, Cl. 415-104.000.

Morikawa, Tuneo: *See*—
Kabe, Kazuyuki; and Morikawa, Tuneo, 4,715,420, Cl. 152-557.000.

Morimoto, Akira, to Asahi Kogaku Kogyo Kabushiki Kaisha. Scanning optical system for laser beam printers. 4,715,699, Cl. 350-6.800.

Morin, Thomas M., to Sprague Electric Company. Method of curtain coating to make thin dielectric ceramic layers. 4,716,058, Cl. 427-420.000.

Morioka, Akira; Matsuura, Takeshi; and Takahira, Yoshiyuki, to Hitachi Maxell, Ltd. Magnetic recording medium. 4,716,076, Cl. 428-323.000.

Morisawa, Yasuhiro: *See*—
Tomita, Kuniyuki; Shimoji, Yasuo; Kumakura, Seiji; Koike, Hiroyuki; Iwata, Nobuyoshi; and Morisawa, Yasuhiro, 4,716,162, Cl. 514-234.000.

Morishita, Akira; Okamoto, Kyoithi; Gotoh, Toshihiko; Kako, Yukio; and Arima, Takemi, to Mitsubishi Denki Kabushiki Kaisha. Planetary reduction gear having a molded ring gear. 4,715,243, Cl. 74-434.000.

Morishita, Masataka; Ono, Masaru; and Sumita, Yukio, to Toyo Jozo Company, Ltd. Stable oral preparation of macrolide antibiotics and method for stabilizing the same. 4,716,153, Cl. 514-30.000.

Morishita, Mitsuharu; and Kouge, Shinichi, to Mitsubishi Denki Kabushiki Kaisha. Device for controlling a charging generator. 4,716,355, Cl. 320-64.000.

Moriwaki, Hideaki: *See*—
Fujii, Hiroshi; Iio, Tsukasa; Genba, Yasusi; Moriwaki, Hideaki; and Mochizuki, Yoshinori, 4,716,265, Cl. 200-144.00R.

Morley Furniture Spring Corporation: *See*—
Grosby, Lawton H., 4,715,587, Cl. 267-103.000.

Morozumi, Shinji, to Seiko Epson Kabushiki Kaisha. Liquid crystal display device. 4,716,403, Cl. 340-702.000.

Morris, Barry S., to Bloxwich Lock and Stamping Company Limited, The. Demountable hinges. 4,715,090, Cl. 16-261.000.

Morrison, Carl C.: *See*—
Lynm, Dwo; Morrison, Carl C.; and Hutcherson, Ronald W., Sr., 4,715,389, Cl. 131-335.000.

Morrison, Garrett L., to United States of America, America. Method for simultaneously scrubbing cement kiln exhaust gas and producing useful by-products therefrom. 4,716,027, Cl. 423-225.000.

Morse, Milton, to Morse, Nena. Vandal-resistant telephone keypad switch. 4,716,262, Cl. 200-5.00A.

Morse, Nena: *See*—
Morse, Milton, 4,716,262, Cl. 200-5.00A.

Morua, Martin: *See*—
Cogan, Kevin C.; Ouellette, Edward L.; and Morua, Martin, 4,715,957, Cl. 210-497.300.

Mosby, Ewen. Harvesting machine with twin headers. 4,715,172, Cl. 56-228.000.

Mosiewicz, Antonio, to Cofimco S.p.A. Blade support hub for an axial fan. 4,715,784, Cl. 416-208.000.

Moslehi, Mehrdad M.; Fu, Chi Y.; and Saraswat, Krishna, to Leland Stanford Junior University, The Board of Trustees of the. Low-temperature direct nitridation of silicon in nitrogen plasma generated by microwave discharge. 4,715,937, Cl. 204-177.000.

Mossaad, Amgad S.: *See*—
Scymanski, Gerald L.; Mossaad, Amgad S.; and Hussain, Saadat, 4,716,251, Cl. 568-645.000.

Motegi, Akio; and Saito, Takao, to Sanyei Corp. Electric steam iron having a detachable handle. 4,716,276, Cl. 219-253.000.

Motorola, Inc.: *See*—
Baskett, Ira E.; and Sluss, Gene T., 4,716,547, Cl. 365-96.000.
Borras, Jaime Andres, 4,716,407, Cl. 340-825.040.
Davis, William F., 4,716,379, Cl. 330-252.000.
Edminster, Robert E., 4,715,757, Cl. 411-411.000.
Flannagan, Stephen T.; Day, Lawrence J.; and Simon, Barry A., 4,716,302, Cl. 307-200.00B.
Flannagan, Stephen T.; and Reed, Paul A., 4,716,550, Cl. 365-207.000.
Higgins, Robert J., Jr., 4,716,331, Cl. 310-330.000.
Moutrie, Michael F.; Sokola, Raymond L.; and Gordon, Phillip J., 4,716,391, Cl. 333-206.000.
Pace, W. David; and Wang, Wei C., 4,716,510, Cl. 363-49.000.
Rebeschini, Michael E., 4,716,319, Cl. 307-520.000.
Vyne, Robert L.; and Susak, David M., 4,716,356, Cl. 323-312.000.

Mouissie, Bob; and Libregts, Hubertus B., to Du Pont de Nemours, E. I., and Company. Connector with pierce contact element having reduced wear crown. 4,715,825, Cl. 439-391.000.

Moutrie, Michael F.; Sokola, Raymond L.; and Gordon, Phillip J., to Motorola, Inc. Multiple resonator component-mountable filter. 4,716,391, Cl. 333-206.000.

MRT System Aktiebolag: *See*—
Kulander, Hans, 4,715,838, Cl. 445-61.000.

Mueller, Birgit: *See*—
Mack, Gerhard; Mueller, Birgit; Jung, Guenter; and Frass, Werner, 4,716,098, Cl. 430-331.000.

Mueller, Fritz. Swinging device. 4,715,580, Cl. 251-229.000.

Mueller, Herbert: *See*—
Nelson, David C.; Fresh, Michael J.; and Mueller, Herbert, 4,715,841, Cl. 446-222.000.

Mueller, Michael W.: *See*—
Mueller, Teresa L.; and Mueller, Michael W., 4,715,634, Cl. 294-50.500.

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Muhlbauer, Ernst. Method of determining materials of suitable colours for a tooth repair layer of prosthesis facet, and a sample set for applying this method. 4,715,813, Cl. 433-26.000.

Mukai, Hirokatsu: *See*—
Hori, Makoto; Nagaya, Toshiatsu; Mukai, Hirokatsu; Niwa, Hitoshi; and Miwa, Naoto, 4,716,279, Cl. 219-541.000.

Mukherjee, Jyoti: *See*—
Wolf, Heinz K.; and Mukherjee, Jyoti, 4,715,102, Cl. 29-27.00R.

Mulder, Cornelis; and Wulms, Henricus E. J., to U.S. Philips Corporation. Integrated circuit. 4,716,314, Cl. 307-477.000.

Mulder, Douglas C., to Nordson Corporation. Powder spray gun. 4,715,535, Cl. 239-1.000.

Mulder, James R.: *See*—
Staun, Paul R.; and Mulder, James R., 4,715,402, Cl. 137-355.170.

Mullane, John F.: *See*—
Ryder, Steven W.; Shand, David G.; and Mullane, John F., 4,716,177, Cl. 514-524.000.

Muller, Beat: *See*—
Lukaszczyk, Alfons; Martin, Henry; Diel, Peter J.; Fory, Werner; Gotzi, Karl; Kristinsson, Haukur; Muller, Beat; Muntwyler, Rene ; Pachlatko, Johannes P.; Rempfler, Hermann; Schurter, Rolf; and Szczepanski, Henry, 4,715,883, Cl. 71-90.000.

Muller, Dieter: *See*—
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Muller, Dieter J., to Huels Aktiengesellschaft. Process for the production of 3,3-dichloro-2-methylpropene. 4,716,255, Cl. 570-216.000.

Muller, Eckart; and Beckmann, Rudolf, to Volkswagen AG. Method and device for the removal of solid components contained in the exhaust gases of internal combustion engines. 4,715,179, Cl. 60-274.000.

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Gaechter, Bernhard; Braunecker, Bernhard; and Muller, Fritz, 4,715,714, Cl. 356-375.000.

Muller, Gary R.; Theiss, Scott M.; Brown, James E., Jr.; and Lawson, Bobby R., to Apex Technologies, Inc. Nuclear steam generator sludge lancing method and apparatus. 4,715,324, Cl. 122-381.000.

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Muntwyler, Rene : *See*—
Lukaszczyk, Alfons; Martin, Henry; Diel, Peter J.; Fory, Werner; Gotzi, Karl; Kristinsson, Haukur; Muller, Beat; Muntwyler, Rene ; Pachlatko, Johannes P.; Rempfler, Hermann; Schurter, Rolf; and Szczepanski, Henry, 4,715,883, Cl. 71-90.000.

Murabayashi, Katuyoshi, to Daicel Chemical Industries, Ltd. Resin composition. 4,716,198, Cl. 525-92.000.

Murai, Yoshiichi: *See*—
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Imamura, Kaoru; and Muramoto, Kenichi, 4,716,489, Cl. 361-91.000.

Murasaki, Ryuichi, to Yoshida Kogyo K. K. Apparatus for severing and joining joint piece. 4,715,926, Cl. 156-511.000.

Murata Manufacturing Co., Ltd.: *See*—
Inoue, Jiro, 4,716,377, Cl. 329-117.000.

Murdock, Keith C.; and Webb, Richard L., to American Cyanamid Company. Process for preparing certain 1,4-di[ω-(2-hydroxyethylamino)alkylamino]anthraquinone free bases. 4,715,993, Cl. 260-380.000.

Murray, Kevin P.: *See*—
Schmid, Steven R.; Ansel, Robert E.; and Murray, Kevin P., 4,716,209, Cl. 526-261.000.

Murray, Rex E., to Union Carbide Corporation. Oligomerization to alpha-olefins. 4,716,138, Cl. 502-117.000.

Murtha, R. Michael. Stamped concentrators supporting photovoltaic assemblies. 4,716,258, Cl. 136-246.000.

Muscaglione, Giuseppe; and Talpo, Gianpietro, to SACE S.p.A. Costruzioni Elettromeccaniche. Electrical arc quenching chamber, in particular for fluid-quenched circuit breakers. 4,716,266, Cl. 200-148.00R.

Musset, Anthony: *See*—
Lee, Kon J.; and Musset, Anthony, 4,716,340, Cl. 315-111.410.

Myers, Jerome J., to Sheet Metal Connectors, Inc. Damper construction. 4,715,581, Cl. 251-308.000.

Mynott, Ralph; and Verbeek, Johan, to 501 Volvo Car B.V. Frameless turn-up rear window for vehicles. 4,715,647, Cl. 296-152.000.

Nabeshima, Daiki: *See*—
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Nabet, Claude: *See*—
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Nabisco Brands, Inc.: *See*—
Koppa, Daniel A., 4,715,803, Cl. 425-133.100.

Nachbur, Hermann: *See*—
Petitpierre, Jean C.; Nachbur, Hermann; and Wurmli, Albert, 4,716,424, Cl. 503-210.000.
Nagae, Yasutaka, to Fujitsu Limited. Microcomputer. 4,716,521, Cl. 364-200.000.
Nagahara, Shusaku: *See*—
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Nagai, Masaaki, to Fuji Jukogyo Kabushiki Kaisha. System for controlling the ignition timing of an internal combustion engine. 4,715,342, Cl. 123-425.000.
Nagai, Tsuneji: *See*—
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Nagai, Yoichiro; Watanabe, Hamao; and Akutsu, Yoshinori, to Yuki Gosei Kogyo Co., Ltd. 1,2-dichloro-1,2,2-trimethyl-1-phenyldisilane and method for producing the same. 4,716,240, Cl. 556-430.000.
Nagano, Hiroo: *See*—
Minami, Takao; Nagano, Hiroo; Yamanaka, Kazuo; Okada, Yasutaka; Susukida, Hiroshi; Onimura, Kichiro; Yonezawa, Toshio; and Sasaguri, Nobuya, 4,715,909, Cl. 148-410.000.
Nagao, Nobuaki: *See*—
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Nakajima, Shigemi, to Kabushiki Kaisha Nakajima Tekkosho. Lifting magnet unit with a gripping mechanism. 4,715,631, Cl. 294-2.000.
Nakamura, Hideo: *See*—
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Nakamura, Ichiro; Kobayashi, Satoshi; and Sasaki, Eiichi, to Hitachi, Ltd. Hydraulic elevator. 4,715,478, Cl. 187-111.000.
Nakamura, Keiichi; and Suzuki, Mikio, to Toyoda Koki Kabushiki Kaisha. Power steering system with hydraulic reaction. 4,715,464, Cl. 180-142.000.
Nakamura, Kotaro: *See*—
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Nakamura, Shinichi: *See*—
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Nakamura, Takashi: *See*—
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Hattori, Yoshiyuki; Matsui, Kazuma; Imani, Yuichi; Kuno, Akira; Nagata, Tetsuya; Nakane, Koji; and Nomura, Ken, 4,715,663, Cl. 303-110.000.
Nakanishi, Nobuyasu; Ishikawa, Masakazu; Shirai, Akira; and Noguchi, Noboru, to Toyota Jidosha Kabushiki Kaisha. Hydraulic anti-skid brake system with device for improvement in straight-line running stability of vehicle. 4,715,664, Cl. 303-111.000.
Nakanishi, Nobuyasu: *See*—
Otsuki, Hiromi; Numata, Kenichi; Matsuura, Ryoichi; Nomura, Yoshihisa; Nakanishi, Nobuyasu; and Oka, Hiroyuki, 4,715,667, Cl. 303-119.000.
Nakano, Kunimitsu; and Onishi, Hiroyuki, to Matsushita Electric Works, Ltd. Power supply switch. 4,716,392, Cl. 335-189.000.
Nakano, Masao; Takemae, Yoshihiro; Nakano, Tomio; Nozaki, Shigeki; Sato, Kimiaki; and Kodama, Nobumi, to Fujitsu Limited. Semiconductor memory device having a circuit for compensating for discriminating voltage of memory cells. 4,716,549, Cl. 365-203.000.
Nakano, Tomio: *See*—
Nakano, Masao; Takemae, Yoshihiro; Nakano, Tomio; Nozaki, Shigeki; Sato, Kimiaki; and Kodama, Nobumi 4,716,549, Cl. 365-203.000.
Nakao, Hideo; Fujimoto, Koichi; Ishihara, Sadao; Sugawara, Shinichi; and Igarashi, Isamu, to Sankyo Company Limited. 7-(2-aminothiazol-4-yl)-2-(syn)-methoxyiminoacetamido)-3-methoxymethyl-3-cepham-4-carboxylates. 4,716,158, Cl. 514-202.000.
Nakao, Kenichiro: *See*—
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Nakaoka, Kazuhide; Takada, Yoshikazu; Inagaki, Junichi; and Hiura, Akira, to Nippon Kokan Kabushiki Kaisha. Method of producting thin sheet of high Si-Fe alloy. 4,715,905, Cl. 148-111.000.
Nakayama, Jin, to Casio Computer Co., Ltd. Electronic game apparatus. 4,716,529, Cl. 364-410.000.
Nakayama, Wataru: *See*—
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Namensen, Erland: *See*—
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Nasu, Nobuo, to Kabushiki Kaisha Kawakami Seisakusho. Apparatus for vacuum compression of laminated sheet material. 4,715,805, Cl. 425-504.000.
National Business Systems, Inc.: *See*—
Weickert, Walter R.; and Foley, Paul J., 4,715,298, Cl. 101-269.000.
National Distillers and Chemical Corporation: *See*—
Harris, Eugene G., 4,716,146, Cl. 512-21.000.
Staker, Donald D.; and Kain, William S., 4,715,866, Cl. 44-51.000.
National Patent Analytical Systems, Inc.: *See*—
Martin, Peter G., 4,715,386, Cl. 128-733.000.
National Starch and Chemical Corporation: *See*—
Walker, James L.; and Foreman, Paul B., 4,716,194, Cl. 524-806.000.
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Navistar International Transportation Corp.: *See*—
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Navratil, Josef; and Abel, Heinz, to Ciba-Geigy Corporation. Process for dyeing hydrophobic fibre material from aqueous bath containing untreated disperse dye and to adjust the exhausted dye bath for further use. 4,715,863, Cl. 8-440.000.
NCR Corporation: *See*—
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Amacher, Gene L.; Mathes, Gene R.; Paugstat, John F.; and Mergenthaler, Barry M., 4,716,281, Cl. 235-383.000.
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Fujisaki, Hisashi, 4,716,584, Cl. 379-176.000.
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Kondo, Shigeyuki, 4,716,473, Cl. 360-9.100.
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Noda, Seiichi; and Yoshimoto, Makoto, 4,716,385, Cl. 332-9.00R.
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Nelson, David C.; Fresh, Michael J.; and Mueller, Herbert, to Ballon-Mueller AG. Balloon holder. 4,715,841, Cl. 446-222.000.
Nelson, Jeffrey D.; and Scanlon, John F., to Sundstrand Corporation. Ballistic tolerant dual load path ballscrew and ballscrew actuator. 4,715,262, Cl. 89-36.020.
Nelson, Robert S.: *See*—
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Kekewich, Douglas E.; and Nelson, Wendall, 4,715,079, Cl. 15-97.00B.
Nelson, William E.: *See*—
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Prella, Giovanni, 4,716,045, Cl. 426-63.000.
Nestler, Eric, to Symbolics Inc. Light pipe for an optical mouse. 4,716,287, Cl. 250-227.000.
Neuroth, David H.: *See*—
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Neven, Jozef H. M.; Poortman, Boodewijn J.; Tromp, Wouter T.; and Stevens, Udo, to Rheometron AG. Sensor for magnetic-inductive flowmeters. 4,715,233, Cl. 73-871.120.
New Holland Inc.: *See*—
Glass, Emmett F.; and Howell, Edmund O., 4,715,171, Cl. 56-192.000.
New Horizons Product Development Company Limited: *See*—
Chan, Shui L. D., 4,716,505, Cl. 362-287.000.
Newell, Darrel E.; and O'Brien, Mary C., to Micro Research, Inc. Microprocessor controlled lighting system. 4,716,344, Cl. 315-312.000.
Newsome, Reggie: *See*—
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Newton, Gary D. Fluid dispersing checkvalve. 4,715,393, Cl. 137-7.000.
Newton Instrument Company: *See*—
Salmon, Garland R., 4,715,502, Cl. 211-26.000.
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Hanifl, Paul H.; and Newton, John J., Jr., 4,715,545, Cl. 241-169.100.
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NHK Spring Co. Ltd.: *See*—
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Nichols, James L.: *See*—
Tsay, Yuh-Geng; Beigler, Myron A.; Calenoff, Emanuel; Friesen, Gerald L.; and Nichols, James L., 4,716,120, Cl. 436-513.000.
Nichols, Robert L. Medical sterilization container with instrument tray. 4,716,025, Cl. 422-310.000.
Nichols, Walt; Newsome, Reggie; Thesing, Rich; and Houck, Willie, to Philip Morris Incorporated. Matrix entrapment of flavorings for smoking articles. 4,715,390, Cl. 131-335.000.
Nickel, Gerhard: *See*—
Rassmann, Christoph; Nickel, Gerhard; Steinkuhl, Bernd; Merten, Gerhard; and Pfefferle, Egon, 4,715,659, Cl. 299-43.000.
Nicolau, Claude; and Raimond, Jacques, to Inverko Industrie Vertriebs Kontor GmbH & Co., KG. Procedure for the enhancement of the resistance to arsenite and arsenate of *Thiobacillus ferrooxidans* and *Bacillus subtilis*. 4,716,114, Cl. 435-172.300.
Nicoletta, Roger A.; and Downey, Emil. Grasping utensil. 4,715,639, Cl. 294-99.200.
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Nielsen, Susan T.: *See*—
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Nippon Engelhard Ltd.: *See*—
Ito, Takashi; Matsuzawa, Shigemitsu; and Kato, Katsuaki, 4,716,087, Cl. 429-40.000.
Nippon Gakki Seizo Kabushiki Kaisha: *See*—
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Nippon Gear Co., Ltd.: *See*—
Ogawa, Yoshiaki, 4,716,290, Cl. 250-231.0SE.
Nippon Kogaku K. K.: *See*—
Abe, Nobutoshi; and Imamura, Kazunori, 4,715,392, Cl. 134-62.000.
Tanaka, Hiroshi; Iwata, Hiromitsu; and Kakizaki, Yukio, 4,716,299, Cl. 250-571.000.
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Nippon Kokan K.K.: *See*—
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Nippon Kokan Kabushiki Kaisha: *See*—
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Nippon Seiko Kabushiki Kaisha: *See*—
Kan, Yoshiro, 4,715,780, Cl. 415-170.00A.
Nippon Thompson Co., Ltd.: *See*—
Tanaka, Kazuhiko, 4,715,729, Cl. 384-44.000.
Nippondenso Co., Ltd.: *See*—
Hattori, Yoshiyuki; Matsui, Kazuma; Imani, Yuichi; Kuno, Akira; Nagata, Tetsuya; Nakane, Koji; and Nomura, Ken, 4,715,663, Cl. 303-110.000.
Hori, Makoto; Nagaya, Toshiatsu; Mukai, Hirokatsu; Niwa, Hitoshi; and Miwa, Naoto, 4,716,279, Cl. 219-541.000.
Kobayashi, Kiyotaka; Tsukasaki, Hidaka; and Baba, Takaaki, 4,715,348, Cl. 123-571.000.
Nishizawa, Kazutoshi; Takagi, Masashi; and Matsuoka, Akio, 4,715,792, Cl. 417-295.000.
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Otsuki, Hiromi; Numata, Kenichi; Matsuura, Ryoichi; Nomura, Yoshihisa; Nakanishi, Nobuyasu; and Oka, Hiroyuki, 4,715,667, Cl. 303-119.000.
Nishimura, Chitoshi: *See*—
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Nishimura, Masayuki; Suzuki, Shuzo; and Yokoto, Hiroshi, to Sumitomo Electric Industries, Ltd. Fiber for optical transmission. 4,715,695, Cl. 350-96.310.
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Umezawa, Hamao; Takeuchi, Tomio; Kondo, Shinichi; Tanaka, Wataru; Takita, Tomohisa; Nishimura, Yoshio; and Yoshikawa, Hiroshi, 4,716,221, Cl. 536-17.200.
Nishiwaki, Humitoshi: *See*—
Tanaka, Hiroyoshi; Adachi, Masaaki; Tsuda, Yoshiyuki; Ando, Toshiaki; Nishiwaki, Humitoshi; and Aoyama, Shigeo, 4,715,437, Cl. 165-151.000.
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Ota, Masanori; and Sasahara, Hitoshi, 4,715,983, Cl. 252-186.350.
Nissan Motor Company, Limited: *See*—
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Ishii, Katsumi; Hirayama, Kanae; Matsuoka, Yoshio; and Takahashi, Kotei, 4,715,466, Cl. 180-233.000.
Sekine, Yoshitada; Yokota, Fumiki; and Kubota, Hisashi, 4,715,709, Cl. 356-237.000.
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Kitagawa, Keisuke, 4,715,271, Cl. 99-306.000.
Noble, Edward C. Doll construction. 4,715,842, Cl. 446-268.000.
Nobles, William O., to Martin Marietta Corporation. Interconnectable space station module and space station formed therewith. 4,715,566, Cl. 244-159.000.
Noda, Seiichi; and Yoshimoto, Makoto, to NEC Corporation. Multilevel modulator comprising a compact error correcting code producing unit. 4,716,385, Cl. 332-9.00R.
Nogami, Taro, to Hitachi, Ltd. Multiwavelength spectrophotometer. 4,715,712, Cl. 356-328.000.
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Noguchi, Noboru: *See*—
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Nolan, Dennis C.; and Bluma, David A., to MagneTek, Inc. DC motor adaptive controller. 4,716,348, Cl. 318-479.000.
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Hacker, David C., 4,716,354, Cl. 320-39.000.
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Kuo, George; Masiarz, Frank R.; Truett, Martha; Valenzuela, Pablo; Rasmussen, Mirella E.; and Favaloro, Jennifer, 4,716,117, Cl. 435-240.270.
Nordlund, Lester H., to Boeing Company, The. Optomechanical control apparatus. 4,716,399, Cl. 340-365.00P.

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France, Howard G., 4,715,476, Cl. 185-40.6ØR.
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Fucito, Dermot T., 4,716,358, Cl. 323-316.000.
Wight, Mark S., 4,716,578, Cl. 375-20.000.
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Jaksa, Tibor S.; Norton, Richard F.; Hall, Kenneth W.; Butler, Stephen J.; Chicoine, Craig C.; and Bienz, Wilford L., 4,715,103, Cl. 29-156.40R.
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Nakano, Masao; Takemae, Yoshihiro; Nakano, Tomio; Nozaki, Shigeki; Sato, Kimiaki; and Kodama, Nobumi, 4,716,549, Cl. 365-203.000.
Nozaki, Takashi, to Pioneer Electronic Corporation. CATV data transmission method. 4,716,410, Cl. 340-825.520.
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Newell, Darrel E.; and O'Brien, Mary C., 4,716,344, Cl. 315-312.000.
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Couwenberg, Franciscus A. C. M.; Groenenberg, Cornelis J.; and Wetjens, Antonius C. S., 4,716,440, Cl. 355-14.0SH.
O'Connor, Stuart; Bell, Donald; Fox, Trevor R.; and Townsend, Paul, to International Computers Limited. Data transmission system of the star type with enablement passing. 4,716,408, Cl. 340-825.500.
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O'Donnell, Michael S.; and Graham, Robert R. Gas supply safety valve for earthquake protection. 4,715,394, Cl. 137-38.000.
Oexmann, Henry E. R., to Rockwell International Corporation. Autoequalizer. 4,716,577, Cl. 375-15.000.
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Offutt, James C., to Rimball, Inc. Door mounted, height adjustable basketball backboard and rim. 4,715,600, Cl. 273-1.50R.
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Ogawa, Hiroshi; Miyazaki, Yasuyuki; Yoshida, Susumu; and Sasaki, Shinichi, to Kabushiki Kaisha Meidensha. System for automatically controlling movement of unmanned vehicle and method therefor. 4,716,530, Cl. 364-424.000.
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Ogawa, Toshiya; Ueno, Hiroaki; Yamada, Toshiaki; and Haganuma, Tomoyuki, to Ricoh Company, Ltd. Terminal device for editing document and communicating data. 4,716,543, Cl. 364-900.000.
Ogawa, Yoshiaki, to Nippon Gear Co., Ltd. Rotary encoder with intermittent feed means. 4,716,290, Cl. 250-231.0SE.
Oguri, Yasuo; Saito, Junji; and Kijima, Naoto, to Mitsubishi Chemical Industries Ltd. Boehmite. 4,716,029, Cl. 423-625.000.
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Tsuruta, Kenji, 4,715,726, Cl. 374-102.000.
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Oida, Osamu; and Iwakawa, Tsunekiyo, to NEC Corporation. Display device. 4,716,341, Cl. 315-169.400.
Oizumi, Kiyoshi: *See*—
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Oki Electric Industry Co., Ltd.: *See*—
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Mahulikar, Deepak, 4,715,892, Cl. 75-233.000.
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Ord, Inc.: *See*—
Block, Myron J.; and Hirschfeld, Tomas B., 4,716,121, Cl. 436-514.000.

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Ottlik, Norbert, deceased, 4,715,204, Cl. 72-76.000.

Ottlik, Norbert, deceased (by Ottlik, Klara, Elisabeth Nowak, heirs), to M.A.N. Roland Druckmaschinen Aktiengesellschaft. Method and apparatus for accurately centered alignment of a hollow rotation symmetrical workpiece. 4,715,204, Cl. 72-76.000.

Ouellette, Edward L.: *See*—
Cogan, Kevin C.; Ouellette, Edward L.; and Morua, Martin, 4,715,957, Cl. 210-497.300.

Ould, Maxwell K. Edging assembly. 4,715,169, Cl. 56-16.900.

Oura, Masayuki, to Mitsubishi Jukogyo Kabushiki Kaisha. Cutter head in a machine tool. 4,715,752, Cl. 409-232.000.

Ouyang, Kenneth W.: *See*—
Lofgren, Karl M. J.; Shearer, Gerald W.; and Ouyang, Kenneth W., 4,716,383, Cl. 331-117.0FE.

Ovonic Synthetic Materials Company: *See*—
Eichen, Erwin; and Flasck, James D., 4,716,083, Cl. 428-457.000.

Ovonic Synthetic Materials Company, Inc.: *See*—
Ovshinsky, Stanford R.; Hudgens, Stephen J.; Allred, David D.; and Demaggio, Gregory, 4,715,890, Cl. 75-0.5AA.
Ovshinsky, Stanford R.; Hudgens, Stephen J.; Allred, David D.; and DeMaggio, Gregory, 4,715,891, Cl. 75-0.5BA.
Ovshinsky, Stanford R.; Hudgens, Stephen J.; Allred, David D.; and Demaggio, Gregory, to Ovonic Synthetic Materials Company, Inc. Method of preparing a magnetic material. 4,715,890, Cl. 75-0.5AA.
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Owen-Illinois Plastic Products Inc.: *See*—
Chang, Long F.; and Steele, Scott W., 4,715,504, Cl. 215-1.00C.

Owens-Corning Fiberglass Corporation: *See*—
Lewin, David F., 4,716,080, Cl. 428-389.000.

Owens-Illinois Glass Container Inc.: *See*—
Keyes, Melvin H., 4,716,116, Cl. 435-183.000.

Oxley, Donald W.; Bartley, David H.; and McEntee, Timothy J., to Texas Instruments Incorporated. Apparatus and method removing increment/decrement pairs to decimate a block reference stream. 4,716,524, Cl. 364-200.000.

Oxley, Lonnie R., to Deere & Company. Height adjustment for a front mount mower. 4,715,168, Cl. 56-15.800.

Oy Partek AB: *See*—
Moisala, Tapio; and Gustafsson, Jukka, 4,715,877, Cl. 65-15.000.

Oy W. Rosenlew Ab: *See*—
Koskinen, Erkki, 4,715,635, Cl. 294-68.100.

Oy Wartsila AB: *See*—
Wilkman, Goran; Kotilainen, Timo; Pulliainen, Juha; and Lindqvist, Gustav, 4,715,305, Cl. 114-40.000.

Oyaizu, Takeshi, to Yamaha Hatsudoki Kabushiki Kaisha. Valve timing control means for engine. 4,715,333, Cl. 123-90.310.

Ozawa, Kazunori; and Araseki, Takashi, to NEC Corporation. Method and apparatus for encoding voice signals. 4,716,592, Cl. 381-40.000.

Ozawa, Kunitaka; Nakamura, Takashi; Katayama, Akira; Hatanaka, Katsunori; Mori, Tetsuzo; and Takaoka, Makoto, to Canon Kabushiki Kaisha. Recording apparatus. 4,716,421, Cl. 346-140.00R.

Ozawa, Naoki; Akiyama, Toshiyuki; Satoh, Kazuhiro; Nagahara, Syusaku; and Mimura, Itaru, to Hitachi, Ltd. Chrominance signal interpolation device for a color camera. 4,716,455, Cl. 358-44.000.

PA Incorporated: *See*—
Kahil, John E.; Jaynes, Mark S.; and Harrell, Kirby R., 4,715,442, Cl. 166-250.000.

Pace Incorporated: *See*—
Barkley, Vincent P., 4,715,640, Cl. 294-106.000.

Pace, W. David; and Wang, Wei C., to Motorola, Inc. Automatic restart circuit for a switching power supply. 4,716,510, Cl. 363-49.000.

Pachlatko, Johannes P.: *See*—
Lukaszczyk, Alfons; Martin, Henry; Diel, Peter J.; Fory, Werner; Gotzi, Karl; Kristinsson, Haukur; Muller, Beat; Muntwyler, Rene ; Pachlatko, Johannes P.; Rempfler, Hermann; Schurter, Rolf; and Szczepanski, Henry, 4,715,883, Cl. 71-90.000.

Pacholke, Paula J. Solid lubricant additive for gear oils. 4,715,972, Cl. 252-25.000.

Pacific Bell: *See*—
Carse, Gregg D.; and Daines, Bernard N., 4,716,562, Cl. 370-110.100.
Packaging Corporation of America: *See*—
Bixler, Kenneth D., 4,715,529, Cl. 229-2.50R.
Padden, Timothy J.: *See*—
Erdman, Constance E.; and Padden, Timothy J., 4,716,037, Cl. 424-70.000.
Paddock, Stephen W., to Whirlpool Corporation. Wiring for refrigeration apparatus. 4,715,831, Cl. 439-709.000.
Pahl, Scott; and De Simone, Luigi, to Keene Corporation. Light fixture bracket for suspended ceiling. 4,716,504, Cl. 362-150.000.
Paikert, Paul, to GEA Luftkuehlergesellschaft Happel GmbH & Co. Air-cooled tube condenser. 4,715,432, Cl. 165-110.000.
Pakulis, Ivars E., to Advanced Moisture Technology, Inc. Moisture detector apparatus and method. 4,716,360, Cl. 324-58.50A.
Pall Corporation: *See*—
Hurley, John L.; Puzo, Joseph D.; and Tingey, Rosa F., 4,716,074, Cl. 428-220.000.
Palmer, Gary E.: *See*—
Todd, Mike J.; and Palmer, Gary E., 4,715,087, Cl. 15-385.000.
Palmer, Marvin K., to Caterpillar Inc. Mounting apparatus for a grapple head assembly. 4,715,641, Cl. 294-119.400.
Paloma Kogyo Kabushiki Kaisha: *See*—
Yokoyama, Nobuyoshi; and Hayakawa, Tsuneyasu, 4,715,807, Cl. 431-1.000.
Pamler, Gerhard, to Ta Triumph-Adler Aktiengesellschaft. Platen adjusting mechanism. 4,715,734, Cl. 400-56.000.
Panayotatos, Nikos, to Biogen N.V. Vectors for increased expression of cloned genes. 4,716,112, Cl. 435-68.000.
Pankow, Chester W. Supplemental air valve for internal combustion engine. 4,715,351, Cl. 123-587.000.
Panoz, Donald E., to Elan Corporation P.L.C. Controlled absorption methyldopa pharmaceutical formulation. 4,716,040, Cl. 424-459.000.
Paoletti, Luciano, to SPIDEM S.r.l. Emulsifier unit particularly for emulsifying steam and milk to prepare cappuccinos and the like beverages. 4,715,274, Cl. 99-454.000.
Parker, Eric G.: *See*—
Broomfield, Donald J.; Briggs, Paul C.; Parker, Eric G.; and Wagner, David P., 4,715,316, Cl. 118-716.000.
Parker, Fabienne: *See*—
Jolles, Pierre; Migliore-Samour, Daniele; and Parker, Fabienne, 4,716,151, Cl. 514-18.000.
Parker, Joey K.; and Paul, Frank W., to Clemson University. Method and apparatus for repositioning a mislocated object with a robot hand. 4,715,773, Cl. 414-730.000.
Parker, Preston K.; and Toutant, Roy T., to General Electric Company. Conveyer system. 4,715,286, Cl. 104-88.000.
Parker, Robert P., to RCA Corporation. Single channel if for video and audio. 4,716,464, Cl. 358-197.000.
Parker, Theodore L., to Dow Chemical Company, The. Use, as latent cross-linkers for epoxy resins, of compounds which can be rearranged in situ to difunctional phenols. 4,716,204, Cl. 525-504.000.
Parlak, Edward A.: *See*—
Gallo, Frank G.; Swenson, Clark E.; Bencloski, William A.; Cassette, Angelo J.; Manno, John L.; and Parlak, Edward A., 4,716,010, Cl. 376-260.000.
Parsons, William H.; Schoen, William R.; Patchett, Arthur A.; and Taniguchi, Masao, to Merck & Co., Inc. Novel antibacterial agents and potentiators of carbapenem antibiotics. 4,715,994, Cl. 260-502.50E.
Pasquan, Raymond F. Rotary engine. 4,715,338, Cl. 123-248.000.
Patchett, Arthur A.: *See*—
Parsons, William H.; Schoen, William R.; Patchett, Arthur A.; and Taniguchi, Masao, 4,715,994, Cl. 260-502.50E.
Patel, Raoji, to Unitrode Corporation. Synchronous power rectifier. 4,716,514, Cl. 363-127.000.
Paton, Boris E.; Vasiliev, Vsevolod V.; Bogdanovsky, Valentin A.; Danilyak, Sergei N.; Gavva, Viktor M.; Roiko, Jury P.; and Nushko, Valery A., to Institute Problem Modelirovania V Energetike Akademii Nauk Ukrainskoi SSR. Electric-arc trainer for welders. 4,716,273, Cl. 219-130.010.
Paton, Neil E.: *See*—
Gnanamuthu, Daniel S.; Moores, Ralph J.; Paton, Neil E.; and Vyhna, Richard F., 4,716,270, Cl. 219-121.0LM.
Patraw, Nils E., to Hughes Aircraft Company. Compressive pedestal for microminiature connections. 4,716,049, Cl. 427-96.000.
Patterson, David W.: *See*—
St. Angelo, Stephen; Carver, George C.; Patterson, David W.; and Fremont, Owen K., 4,715,110, Cl. 29-701.000.
Patz, H. Samuel, to Brigham & Women's Hospital. Creation and use of a moving reference frame for NMR imaging of flow. 4,716,367, Cl. 324-309.000.
Paugstat, John F.: *See*—
Amacher, Gene L.; Mathes, Gene R.; Paugstat, John F.; and Mergenthaler, Barry M., 4,715,457, Cl. 177-1.000.
Amacher, Gene L.; Mathes, Gene R.; Paugstat, John F.; and Mergenthaler, Barry M., 4,716,281, Cl. 235-383.000.
Paul, Frank W.: *See*—
Parker, Joey K.; and Paul, Frank W., 4,715,773, Cl. 414-730.000.
Paulsson, Bjorn N. P., to Chevron Research Company. Downhole electromagnetic seismic source. 4,715,470, Cl. 181-106.000.
Paust, Joachim: *See*—
Ernst, Hansgeorg; Littmann, Wolfgang; and Paust, Joachim, 4,716,243, Cl. 558-395.000.
Pavlick, Michael J.; McQueston, James C.; Eggert, Walter S., Jr.; and Sherrow, Lionel. Head end vehicle with crew accommodations with locomotive and other controls. 4,715,292, Cl. 105-456.000.
Pawelski, Robert L., to AT&T Bell Laboratories. Digital video transmission system. 4,716,453, Cl. 358-13.000.
Payne, David G., to Tektronix, Inc. Probe cable assembly. 4,716,500, Cl. 361-398.000.
Payne, Richard K.: *See*—
Rothanavibhata, Adam A.; and Payne, Richard K., 4,715,969, Cl. 252-8.700.
Payview Limited: *See*—
Thompson, John R.; Hunting, Curtis J.; Masson, Ronald K.; and Trivelpiece, Craig E., 4,716,588, Cl. 380-20.000.
Pean, Jean-Louis; Desvard, Catherine; and Barbier, Jean-Paul, to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes George Claude. Composition for checking the functioning of fire detection installations and application to various types of detectors. 4,715,985, Cl. 252-305.000.
Peddinghaus Corporation: *See*—
Magnuson, James M., 4,715,774, Cl. 414-751.000.
Pella, Amy, to Chevron Research Co. Valve wrench. 4,715,252, Cl. 81-176.100.
Peltz, Curtis L.; Martin, George F.; and Blake, Peter H., to Timberline Software Corporation. Method and apparatus for single source entry of analog and digital data into a computer. 4,716,542, Cl. 364-900.000.
Penneck, Richard J.: *See*—
Booth, Michael; and Penneck, Richard J., 4,715,098, Cl. 29-25.350.
Pennington, Virginia W.: *See*—
MacAllister, Donald J.; and Pennington, Virginia W., 4,715,444, Cl. 166-269.000.
Penunuri, David: *See*—
Elliott, Jeffrey H.; Stokes, Robert B.; Penunuri, David; and Yen, Kuo-Hsiung, 4,716,390, Cl. 333-202.000.
Pera, Ivo, to Goliarda Mugnai Trust. Magnetizing hydrocarbon fuels and other fluids. 4,716,024, Cl. 422-186.010.
Perazzo, Nicholas J., to Bemis Company, Inc. Method and apparatus for check-weighing charges for containers. 4,715,412, Cl. 141-1.000.
Perhach, John M.; Porter, Charles E., Jr.; and Maloney, David C., to Aro Corporation, The. Method and apparatus for testing the fluid-tight sealed integrity of a hermetically-sealed package in a rapidly-stabilized environment. 4,715,215, Cl. 73-49.300.
Perkin-Elmer Corporation, The: *See*—
McCaffrey, John T., 4,716,342, Cl. 315-219.000.
Person, Eric N.: *See*—
Luperti, Harry E.; Person, Eric N.; and Simmel, Thomas, 4,715,164, Cl. 53-381.00R.
Pescatore, John C.: *See*—
Burrus, Gilbert S., Jr.; Cooper, Ronald J.; Marr, Michael R.; Pescatore, John C.; and Marsico, Mario A., 4,716,523, Cl. 364-200.000.
Pessi, Antonello: *See*—
Bonelli, Fabio; Pessi, Antonello; and Verdini, Antonio S., 4,716,149, Cl. 514-13.000.
Peters Maschinenfabrik GmbH: *See*—
Hofmeister, Walter; and Demmin, Gunter, 4,715,925, Cl. 156-470.000.
Peterson, Edward C.: *See*—
Johanson, Robert H.; Montgomery, Raymond M.; Herndon, Michael T.; and Peterson, Edward C., 4,715,086, Cl. 15-339.000.
Peterson, Paul J., to Goodyear Tire & Rubber Company, The. Method for belt splice preparation. 4,715,106, Cl. 29-426.400.
Petitpierre, Jean C.; Nachbur, Hermann; and Wurmli, Albert, to Ciba-Geigy Corporation. Pressure-sensitive or heat-sensitive recording material. 4,716,424, Cl. 503-210.000.
Petrillo, Edward W., Jr.: *See*—
Karanewsky, Donald S.; and Petrillo, Edward W., Jr., 4,716,155, Cl. 514-89.000.
Petrophysical Services, Inc.: *See*—
Yasuda, Arthur K.; Kennedy, William S.; and Aronstam, Peter S., 4,715,469, Cl. 181-102.000.
Pettke, Felix; Siwon, Hans; and Meixner, Hans, to Siemens Aktiengesellschaft. Pyrodetector for the detection of a body entering into its detection area. 4,716,294, Cl. 250-353.000.
Pfaff Industriemaschinen GmbH: *See*—
Busch, Edgar; Schilling, Lothar; and Ziegler, Klaus, 4,715,303, Cl. 112-256.000.
Pfaffmann, George D., to Tocco, Inc. Method for heat treating ferrous parts. 4,715,907, Cl. 148-144.000.
Pfefferle, Egon: *See*—
Rassmann, Christoph; Nickel, Gerhard; Steinkuhl, Bernd; Merten, Gerhard; and Pfefferle, Egon, 4,715,659, Cl. 299-43.000.
Pfeifer, Josef: *See*—
Howell, Frederick H.; and Pfeifer, Josef, 4,716,248, Cl. 564-454.000.
Pfeiffer, Loren N.: *See*—
Duguay, Michel A.; Koch, Thomas L.; Kokubun, Yasuo; and Pfeiffer, Loren N., 4,715,672, Cl. 350-96.120.
Pfizer Hospital Products Group, Inc.: *See*—
D'Antonio, Nicholas F.; and D'Antonio, Nicholas J., 4,715,855, Cl. 604-320.000.
Pfizer Inc.: *See*—
Goddard, Carl J., 4,716,231, Cl. 546-298.000.
Urban, Frank J., 4,716,113, Cl. 435-125.000.
Pharmacia AB: *See*—
Malson, Tomas; and Lindqvist, Bengt L., 4,716,154, Cl. 514-54.000.

Philip Morris Incorporated: *See*—
Nichols, Walt; Newsome, Reggie; Thesing, Rich; and Houck, Willie, 4,715,390, Cl. 131-335.000.
Rainer, Norman B., 4,715,388, Cl. 131-309.000.
Philipp, Gottfried: *See*—
Dislich, Helmut; Arfsten, Nanning J.; Schmidt, Helmut; Philipp, Gottfried; and Tuenker, Gerhard, 4,715,999, Cl. 264-1.100.
Philippbar, Jay E.; Smith, Chadwick F.; and Sutter, Leroy V., Jr. Gas insufflation apparatus for use with an arthroscopic laser system. 4,715,372, Cl. 128-303.100.
Phillips Petroleum Company: *See*—
Cobb, Raymond L., 4,716,254, Cl. 570-147.000.
Gaughan, Roger G., 4,716,212, Cl. 528-226.000.
Johnson, Marvin M.; and Nowack, Gerhard P., 4,716,256, Cl. 585-274.000.
Sughrue, Edward L., II; Kukes, Simon G.; and Hogan, Robert J., 4,715,948, Cl. 208-251.00H.
Phonetics, Inc.: *See*—
Blanchard, Kenneth E.; and Sanislo, Stephen V., Jr., 4,716,582, Cl. 379-28.000.
Picanol N.V.: *See*—
Van Bogaert, Philippe; and Deconinck, Filip, 4,715,411, Cl. 139-452.000.
Pichler, Klaus, to Siemens Aktiengesellschaft. Closure system for a longitudinally divided cable sleeve. 4,715,740, Cl. 403-313.000.
Picker International, Inc.: *See*—
Dragmen, Kenneth J., Sr., 4,715,591, Cl. 269-322.000.
Haacke, E. Mark, 4,716,368, Cl. 324-309.000.
Pickles, Charles S.: *See*—
Andrews, Howard W., Jr.; Pickles, Charles S.; and Taylor, Attalee S., 4,715,820, Cl. 439-59.000.
Pike, William C.: *See*—
Bollands, Martin A.; Pike, William C.; Thukral, Prem S.; and Woolmington, Timothy P., 4,715,455, Cl. 175-402.000.
Pinto, Akiva: *See*—
Hergeth, Adolph; Lucassen, Gunter; and Pinto, Akiva, 4,715,722, Cl. 366-132.000.
Pioneer Electronic Corporation: *See*—
Nozaki, Takashi, 4,716,410, Cl. 340-825.520.
Piplica, Eugene J.: *See*—
Carlson, William R.; and Piplica, Eugene J., 4,716,007, Cl. 376-209.000.
Pitney Bowes Inc.: *See*—
Luperti, Harry E.; Person, Eric N.; and Simmel, Thomas, 4,715,164, Cl. 53-381.00R.
Pittaro, Richard J.: *See*—
Dukes, John N.; Carlsen, William F., Jr.; and Pittaro, Richard J., 4,716,363, Cl. 324-77.00R.
Pittet, Alan O., to International Flavors & Fragrances Inc. Process for preparing natural benzaldehyde and acetaldehyde. 4,716,249, Cl. 568-433.000.
Pittman, Roland, to Singer Company, The. Multisensor assembly with angular rate piezoelectric crystal beam. 4,715,227, Cl. 73-504.000.
Place, John; and Bregnard, Andre , to Battelle Memorial Institute. Apparatus for separating a mixture of components by thin layer electrophoresis. 4,715,943, Cl. 204-299.00R.
Plant Genetics, Inc.: *See*—
Redenbaugh, M. Keith; and Reyes, Zoila, 4,715,143, Cl. 47-57.600.
Plastic Recycling Inc.: *See*—
Ruppman, Kurt H.; and Prano, Charles A., 4,715,920, Cl. 156-344.000.
Plate, Hans-Georg: *See*—
Soltow, Uwe; Guthke, Hans-Peter; Plate, Hans-Georg; Lechner, Johann; and Kirma, Safa, 4,715,571, Cl. 248-68.100.
Ploppa, Jurgen; and Schmid, Franz, to H. Stoll GmbH & Co. Control magnet assembly for a pattern apparatus in knitting machines for electrically controlled needle selection. 4,715,198, Cl. 66-75.200.
Pluss, Heinz: *See*—
Gehring, Manfred; and Pluss, Heinz, 4,715,626, Cl. 285-230.000.
Poccard, Jacques, to Aerospatiale Societe Nationale Industrielle. System for coupling two flaps of an aircraft wing, and an aircraft wing equipped with such a system. 4,715,567, Cl. 244-213.000.
Podoll, Michael J.; and Jensen, Peter J., to LeFebure Corporation. Large capacity single overhead pneumatic tube system. 4,715,750, Cl. 406-111.000.
Poe, Frank E., Jr.; Schwertner, Dan R.; Dunn, Cooper L.; and Whitby, Melvyn F., to Bowen Tools, Inc. Slips for well pipe. 4,715,456, Cl. 175-423.000.
Pohl, Joerg: *See*—
Engel, Jurgen; Kleemann, Axel; Niemeyer, Ulf; Hilgard, Peter; and Pohl, Joerg, 4,716,242, Cl. 558-81.000.
Pohl, Peter: *See*—
Schulz, Dietmar; Pohl, Peter; and Johnson, Alfred H., 4,715,674, Cl. 350-96.210.
Polaroid Corporation: *See*—
Mason, Paul B., 4,716,092, Cl. 430-209.000.
Pomini Farrel S.p.A.: *See*—
Forni, Luigi, 4,715,206, Cl. 72-237.000.
Pool, James L., to Lisle Corporation. Circuit tester. 4,716,365, Cl. 324-158.00P.
Poortman, Boodewijn J.: *See*—
Neven, Jozef H. M.; Poortman, Boodewijn J.; Tromp, Wouter T.; and Stevens, Udo, 4,715,233, Cl. 73-871.120.
Pope, J. Lee, Jr.; and Resden, Ronald E., to Mansfield Scientific, Inc. Balloon catheter. 4,715,378, Cl. 128-344.000.
Port, David J.: *See*—
Houck, David L.; Port, David J.; and Lee, Jen S., 4,716,019, Cl. 419-17.000.
Porta Systems Corp.: *See*—
De Luca, Paul V., 4,715,830, Cl. 439-709.000.
Porter, Charles E., Jr.: *See*—
Perhach, John M.; Porter, Charles E., Jr.; and Maloney, David C., 4,715,215, Cl. 73-49.300.
Portnoy, Norman A.; and Avery, Larry P., to A. E. Staley Manufacturing Company. Starch derivatives and methods of making using same. 4,716,186, Cl. 524-50.000.
Post Machinery, Inc.: *See*—
Zak, Chet, 4,715,846, Cl. 493-10.000.
Potter, Charles; Bell, Ronald F.; and Tosill, John M., to Go-Jo Industries, Inc. Dispenser having a roller for squeezing material from a tube. 4,715,517, Cl. 222-181.000.
Poulin, Suzanne C. M.: *See*—
Brine, Satya S.; Baines, John H.; and Poulin, Suzanne C. M., 4,715,628, Cl. 292-19.000.
Powell, Michael J.: *See*—
Baker, Terence S.; Powell, Michael J.; and Titmas, Richard C., 4,716,109, Cl. 435-7.000.
Powell, Robert J. W.: *See*—
Johnson, Oliver S.; and Powell, Robert J. W., 4,715,678, Cl. 350-96.230.
Pozzobon, Alessandro, to Nordica S.p.A. Ski boot for disappearing-type bindings. 4,715,132, Cl. 36-117.000.
PPG Industries, Inc.: *See*—
Beaver, Richard P., 4,715,105, Cl. 29-419.00G.
Gillery, F. Howard; Criss, Russell C.; and Finley, James J., 4,716,086, Cl. 428-630.000.
Johnson, Mark W., 4,715,898, Cl. 106-308.00Q.
Raju, Muppala S., 4,715,882, Cl. 71-86.000.
Prad Research and Development NV: *See*—
Sheppard, Michael, 4,715,452, Cl. 175-61.000.
Prano, Charles A.: *See*—
Ruppman, Kurt H.; and Prano, Charles A., 4,715,920, Cl. 156-344.000.
Prella, Giovanni, to Nestec S.A. Process for the manufacture of a dairy product. 4,716,045, Cl. 426-63.000.
Premiere Casing Services, Inc.: *See*—
Shows, Jess W., Jr.; and Hayatdavoudi, Asadollah, 4,715,625, Cl. 285-145.000.
Preputnick, George, to AMP Incorporated. High density electrical connector system. 4,715,829, Cl. 439-660.000.
Presto Products, Incorporated: *See*—
Winter, John P., 4,716,061, Cl. 428-35.000.
Preston, Donald: *See*—
Mainelli, Roy J.; and Preston, Donald, 4,715,395, Cl. 138-42.000.
Pribis, Paul B.; and West, Herbert J., to General Electric Company. Seal. 4,715,260, Cl. 89-7.000.
Priestley, Joseph B., Jr. Particle treatment apparatus. 4,716,022, Cl. 422-140.000.
Prindle, Gordon E., to Ideal Instruments, Inc. Back-fill syringe. 4,715,853, Cl. 604-184.000.
Printmark, Inc.: *See*—
Sloot, Alexander, 4,715,619, Cl. 281-19.00R.
Pritchard, Dalton H.: *See*—
Wargo, Robert A.; Harwood, Leopold A.; Pritchard, Dalton H.; and Chartier, Michael S., 4,716,462, Cl. 358-166.000.
Procter & Gamble Company, The: *See*—
Moore, Jeffrey E.; Evans, Brett A.; and Hansen, Richard, 4,715,979, Cl. 252-91.000.
Sampathkumar, Padmini, 4,716,035, Cl. 424-52.000.
Proebsting, Robert J., to Thomson Components-Mostek Corporation. FET differential amplifier. 4,716,380, Cl. 330-253.000.
Professional Packaging Limited: *See*—
Holmes, Gordon W., 4,715,492, Cl. 206-0.830.
Progress-Elektrogeraete Mauz & Pfeiffer GmbH & Co.: *See*—
Jacob, Gernot; and Radom, Leon, 4,715,084, Cl. 15-328.000.
PROMA Produkt-und Marketing Gesellschaft mbH: *See*—
Lipinski, Reinhard; and Kaiser, Siegmund H., 4,715,241, Cl. 74-89.150.
Provin, Gerard; Forestiere, Alain; and Commereuc, Dominique, to Institut Francais du Petrole. Nickel composition soluble in hydrocarbons. 4,716,239, Cl. 556-147.000.
Prucha, David A.: *See*—
Walker, Lonnie R.; Berryman, Leslie N.; Guffee, Larry E.; Ripley, David E.; and Prucha, David A., 4,715,721, Cl. 366-132.000.
Pruyne, Lori S.: *See*—
Kopatz, Nelson E.; and Pruyne, Lori S., 4,715,878, Cl. 65-21.100.
Pryor, Roger W.: *See*—
Yaniv, Zvi; Canella, Vincent D.; Chapelle, Walter E.; and Pryor, Roger W., 4,715,685, Cl. 350-332.000.
Puget Sound Power and Light Company: *See*—
Willert, Thomas E., 4,715,236, Cl. 73-863.860.
Pulliainen, Juha: *See*—
Wilkman, Goran; Kotilainen, Timo; Pulliainen, Juha; and Lindqvist, Gustav, 4,715,305, Cl. 114-40.000.
Purdue Research Foundation: *See*—
Chen, Li-Fu; and Hoff, Johan E., 4,716,218, Cl. 530-372.000.
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Hurley, John L.; Puzo, Joseph D.; and Tingey, Rosa F., 4,716,074, Cl. 428-220.000.

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Quatse, Jesse T. Improved Boolean processor for a programmable controller. 4,716,541, Cl. 364-900.000.
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Knight, John K., 4,715,598, Cl. 272-3.000.
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Lynm, Dwo; Morrison, Carl C.; and Hutcherson, Ronald W., Sr., 4,715,389, Cl. 131-335.000.
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Nicolau, Claude; and Raimond, Jacques, 4,716,114, Cl. 435-172.300.
Rainer, Norman B., to Philip Morris Incorporated. Cigarettes having minimized loose ends and a process for preparing same. 4,715,388, Cl. 131-309.000.
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Raju, Muppala S., to PPG Industries, Inc. Substituted phenoxypropionaldehyde derivates and their use as herbicidal agents. 4,715,882, Cl. 71-86.000.
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Ramshaw, Colin, to Imperial Chemical Industries PLC. Degassing of liquids. 4,715,869, Cl. 55-53.000.
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McKee, John M.; and Ranalletta, Joseph V., 4,716,501, Cl. 362-31.000.
Randa, Stuart K., to Du Pont de Nemours, E. I., and Company. Thin wall high performance insulation on wire. 4,716,073, Cl. 428-215.000.
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Rasmussen, Mirella E.: *See*—
Kuo, George; Masiarz, Frank R.; Truett, Martha; Valenzuela, Pablo; Rasmussen, Mirella E.; and Favaloro, Jennifer, 4,716,117, Cl. 435-240.270.
Rassmann, Christoph; Nickel, Gerhard; Steinkuhl, Bernd; Merten, Gerhard; and Pfefferle, Egon, to Gewerkschaft Eisenhutte Westfalia GmbH. Mineral mining installations. 4,715,659, Cl. 299-43.000.
Rausch, Peter: *See*—
Baier, Paul W.; and Rausch, Peter, 4,716,574, Cl. 375-1.000.
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Gamarra, Jose P.; and Swinmurn, C. John, 4,716,183, Cl. 522-80.000.
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Raymond, Dean; and Metrosky, John J. Basketball backboard for a diving board. 4,715,599, Cl. 273-15.00R.
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Bell, Isaac M., 4,716,315, Cl. 307-491.000.
Hinn, Werner, 4,716,461, Cl. 358-165.000.
Hsu, Sheng T.; and Flatley, Doris W., 4,716,451, Cl. 357-42.000.
Parker, Robert P., 4,716,464, Cl. 358-197.000.
Savoye, Eugene D., 4,716,447, Cl. 357-24.000.
Wargo, Robert A.; Harwood, Leopold A.; Pritchard, Dalton H.; and Chartier, Michael S., 4,716,462, Cl. 358-166.000.
Realex Corporation: *See*—
Moore, David G., 4,715,518, Cl. 222-257.000.
Reames, Carter, Jr. Automatic fuel shut off system for fuel-injected engines. 4,715,345, Cl. 123-512.000.
Reaves, Benjamin H.: *See*—
Lambousy, George G.; Reaves, Benjamin H.; and Nelson, William E., 4,715,996, Cl. 261-114.200.
Rebeschini, Michael E., to Motorola, Inc. Switched capacitor filter for low voltage applications. 4,716,319, Cl. 307-520.000.
Reborn Products Co., Inc.: *See*—
Ford, Allan L.; and Baronoff, Jay H., 4,715,839, Cl. 446-28.000.
Recoton Corporation: *See*—
Yeung, Choi K., 4,716,485, Cl. 360-128.000.
Redenbaugh, M. Keith; and Reyes, Zoila, to Plant Genetics, Inc. Artificial seed coat for botanic seed analogs. 4,715,143, Cl. 47-57.600.
Redicon Corporation: *See*—
Bulso, Joseph D., Jr.; and McClung, James A., 4,715,208, Cl. 72-348.000.
Reed, Paul A.: *See*—
Flannagan, Stephen T.; and Reed, Paul A., 4,716,550, Cl. 365-207.000.
Reeves, Ian B.: *See*—
Brown, Alan P. B.; and Reeves, Ian B., 4,715,424, Cl. 164-264.000.
Rehner, Helmut; and Roeschlau, Peter, to Boehringer Mannheim GmbH. Control serum and process therefor. 4,716,119, Cl. 436-16.000.
Reichert, Ernst; and Schutt, Karl, to Stump Bohr GmbH. Ground anchor system. 4,715,745, Cl. 405-262.000.
Reichman, Benjamin; Venkatesan, Srini; Fetcenko, Michael A.; Jeffries, Kenneth; Stahl, Sharon; and Bennett, Clifford, to Energy Conversion Devices, Inc. Activated rechargeable hydrogen storage electrode and method. 4,716,088, Cl. 429-101.000.
Reinecke, Paul: *See*—
Fest, Christa; Brandes, Wilhelm; Hanssler, Gerd; and Reinecke, Paul, 4,716,176, Cl. 514-477.000.
Reinhold, Donald F.; Utne, Torleif; and Abramson, Newton L., to Merck & Co., Inc. Process for L-dopa. 4,716,246, Cl. 562-446.000.
Reinicke, Robert H.; and Yamato, Lance M., to Eaton Corporation. Implanted medication infusion device. 4,715,852, Cl. 604-131.000.
Reiter, Alois: *See*—
Habrich, Reiner; Bauer, Manfred; and Reiter, Alois, 4,715,795, Cl. 417-568.000.
Relis, Joseph: *See*—
Holtzman, Abraham M.; and Relis, Joseph, 4,715,894, Cl. 106-1.220.
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Lukaszczyk, Alfons; Martin, Henry; Diel, Peter J.; Fory, Werner; Gotzi, Karl; Kristinsson, Haukur; Muller, Beat; Mustwyler, Rene ; Pachlatko, Johannes P.; Rempfler, Hermann; Schurter, Rolf; and Szczepanski, Henry, 4,715,883, Cl. 71-90.000.
Renard, Pierre: *See*—
Le Page, Jean-Francois; Billon, Alain; Morel, Frederic; Renard, Pierre; Biedermann, Jean-Michel; Laborde, Michel; and Bousquet, Jacques, 4,715,946, Cl. 208-45.000.
Renaud, Merle A.: *See*—
Han, Doyoung; and Renaud, Merle A., 4,715,190, Cl. 62-201.000.
Renfro, James G.: *See*—
Berry, Joe R.; Langowski, Faustyn C.; Renfro, James G.; and Smith, Roger, Jr., 4,715,761, Cl. 414-22.000.
Renz, Wacker & Co. Maschinenfabrik: *See*—
Wacker, Hans, 4,716,268, Cl. 219-118.000.
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Timar, Tibor; Zsupan, Kalman; Repasi, Janos; Borsos nee Safranek, Iren; Kiss, Istvan; Fodor, Amdras; and Maroy, Peter, 4,716,238, Cl. 549-408.000.
Resden, Ronald E.: *See*—
Pope, J. Lee, Jr.; and Resden, Ronald E., 4,715,378, Cl. 128-344.000.
Research Dev. Corp. of Japan: *See*—
Mishima, Masayuki, 4,715,961, Cl. 210-692.000.
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Redenbaugh, M. Keith; and Reyes, Zoila, 4,715,143, Cl. 47-57.600.
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Reynolds, Howard S. Gas burner with heat reflective radiants for controlled heat concentration. 4,715,356, Cl. 126-39.00H.
Reynolds, Roger G., to Weldex, Inc. Three phase high frequency spike welding system. 4,716,267, Cl. 219-113.000.
Rheometron AG: *See*—
Neven, Jozef H. M.; Poortman, Boodewijn J.; Tromp, Wouter T.; and Stevens, Udo, 4,715,233, Cl. 73-871.120.
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Jolles, Pierre; Migliore-Samour, Daniele; and Parker, Fabienne, 4,716,151, Cl. 514-18.000.
Rialan, Joseph: *See*—
Douaud, Andre; and Rialan, Joseph, 4,715,341, Cl. 123-425.000.
Richal Corporation: *See*—
Gurega, Richard R., 4,715,785, Cl. 417-1.000.
Richard, Joseph D. Self-destruct fish hook. 4,715,142, Cl. 43-43.160.
Richey, Alvin. Floating breakwater. 4,715,744, Cl. 405-26.000.
Richmond, John W., to AE PLC. Bearing surface for internal combustion engine piston skirt. 4,715,267, Cl. 92-232.000.
Richter, Wolfgang: *See*—
Kaempf, Karl; Zaehner, Paul; and Richter, Wolfgang, 4,715,237, Cl. 73-864.620.
Ricoh Company, Ltd.: *See*—
Ogawa, Toshiya; Ueno, Hiroaki; Yamada, Toshiaki; and Haganuma, Tomoyuki, 4,716,543, Cl. 364-900.000.
Sakurai, Yasuo, 4,715,597, Cl. 271-122.000.
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Riddle, Robert R.: *See*—
Gruber, James R.; Gudath, Ernest A.; Michalski, Dennis H.; Riddle, Robert R.; and Stana, Regis R., 4,716,026, Cl. 423-167.000.
Rieder, Heinz; and Schwaiger, Max, to RSF-Electronik Gesellschaft m.b.H. Linear incremental measuring system for measuring speed and displacement. 4,716,292, Cl. 250-237.00G.
Riedhammer, Thomas M.: *See*—
Chanda, Subir; Riedhammer, Thomas M.; and Tometsko, Andrew M., 4,715,899, Cl. 134-26.000.
Riesselmann, Gottfried. Cooking apparatus. 4,715,273, Cl. 99-442.000.
Riester, William C.: *See*—
Gowans, Neil A.; and Riester, William C., 4,715,082, Cl. 15-250.420.
Riggins, Christa: *See*—
Colavito, William; and Riggins, Christa, 4,715,621, Cl. 283-36.000.
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Riker Laboratories, Inc.: *See*—
Scherrer, Robert A.; and Rustad, Mark A., 4,716,178, Cl. 514-563.000.

Rimball, Inc.: *See*—
Offutt, James C., 4,715,600, Cl. 273-1.50R.

Rinkewich, Isaac. Flow restrictor device particularly useful for drip irrigation. 4,715,543, Cl. 239-542.000.

Ripley, David E.: *See*—
Walker, Lonnie R.; Berryman, Leslie N.; Guffee, Larry E.; Ripley, David E.; and Prucha, David A., 4,715,721, Cl. 366-132.000.

Rittler, Hermann L., to Corning Glass Works. Method of treating phyllosilicates. 4,715,987, Cl. 252-315.500.

Robbins, Edward S., III; and Schwertner, Gary T., to Robbins, Edward S., III. Trash bag retainer and air venting device. 4,715,572, Cl. 248-101.000.

Robert Bosch GmbH: *See*—
Fauser, Edwin; and List, Hans, 4,716,372, Cl. 328-146.000.
Fiebig, Arnim; and Weber, Rupert, 4,716,304, Cl. 307-270.000.
Kuhn, Ulrich, 4,715,224, Cl. 73-204.000.
Leiber, Heinz, 4,715,661, Cl. 303-10.000.
van Zanten, Anton; and Heess, Gerhard, 4,715,662, Cl. 303-109.000.

Roberts, Bruce E.; Black, Jimmy C.; and Matlock, Dyer A., to Harris Corporation. Method of ensuring adhesion of chemically vapor deposited oxide to gold integrated circuit interconnect lines. 4,716,071, Cl. 428-209.000.

Robertson, Wayne W.: *See*—
Hilton, Glenn B.; and Robertson, Wayne W., 4,716,196, Cl. 525-72.000.

Robinson, Alan J. Child proof closure device for doors. 4,715,629, Cl. 292-256.000.

Robinson, Alan S.: *See*—
Fuller, Mark W.; and Robinson, Alan S., 4,715,136, Cl. 40-406.000.

Roccucci, Silvio, to Selenia Spazio. PWM inverter with trapezoidal output. 4,716,509, Cl. 363-26.000.

Rock Dock, Inc.: *See*—
Thompson, Larry L., 4,715,307, Cl. 114-65.00A.

Rockefeller University, The: *See*—
Van Eldik, Linda J.; and Watterson, D. Martin, 4,716,150, Cl. 514-14.000.

Rockinger Spezialfabrik fur Anhangerkupplungen GmbH & Co.: *See*—
Breu, Johann, 4,715,611, Cl. 280-504.000.

Rockwell International Corporation: *See*—
Gnanamuthu, Daniel S.; Moores, Ralph J.; Paton, Neil E.; and Vyhna, Richard F., 4,716,270, Cl. 219-121.0LM.
Oexmann, Henry E. R., 4,716,577, Cl. 375-15.000.
Tilly, Peter E., 4,716,374, Cl. 328-169.000.

Rockwood, Clyde R.: *See*—
Waugh, Robert E.; Nannig, Urban R.; and Rockwood, Clyde R., 4,716,052, Cl. 427-147.000.

Rodder, Karl-Martin, to Dynamit Nobel AG. Impregnation of concrete in depth. 4,716,051, Cl. 427-136.000.

Rodder, Karl-Martin: *See*—
Schnippering, Friedhelm; and Rodder, Karl-Martin, 4,715,895, Cl. 106-38.300.

Rodenstock Instrument Corporation: *See*—
Cornsweet, Tom N.; and Hersh, Samuel, 4,715,703, Cl. 351-205.000.

Rodney, Frederick W., Jr. Closed breech muzzle loader and loading tool. 4,715,139, Cl. 42-51.000.

Roe, Malcolm D. M.; and Hicks, Michael E., to Crosfield Electronics Limited. Modulators. 4,716,384, Cl. 332-7.510.

Roehr, William H., Jr.; and Goodman, Richard L., to United States Surgical Corporation. Surgical fastener applying apparatus with tissue edge control. 4,715,520, Cl. 227-19.000.

Roeschlau, Peter: *See*—
Rehner, Helmut; and Roeschlau, Peter, 4,716,119, Cl. 436-16.000.

Roeske, Klaus J.: *See*—
Bishop, Arthur E.; Roeske, Klaus J.; and Scott, David W., 4,715,210, Cl. 72-400.000.

Roessing, Thomas J.: *See*—
Hindman, Thomas D.; Roessing, Thomas J.; and Burkhard, Joseph D., 4,716,191, Cl. 524-488.000.

Rogers, Richard B.; and Herrero, Maria P., to Dow Chemical Company, The. Aryl(aryloxy or arylthio)azolomethanes and their use as pesticides. 4,716,174, Cl. 514-340.000.

Rogoff, Martin H.; and Shieh, Tsuong R., to Sandoz Pharm. Corp. Virus insecticide compositions. 4,716,039, Cl. 424-93.000.

Rohr Industries, Inc.: *See*—
Norris, Brian, 4,715,525, Cl. 228-194.000.

Rohrman, Henry, to Schlegel Corporation. Panel mounting building wall construction. 4,715,153, Cl. 52-213.000.

Roiko, Jury P.: *See*—
Paton, Boris E.; Vasiliev, Vsevolod V.; Bogdanovsky, Valentin A.; Danilyak, Sergei N.; Gavva, Viktor M.; Roiko, Jury P.; and Nushko, Valery A., 4,716,273, Cl. 219-130.010.

Roland Corp.: *See*—
Hoshiai, Atsushi; and Endo, Hiroyuki, 4,715,257, Cl. 84-1.010.

Rolls-Royce plc: *See*—
Livsey, Terry; and Foulkes, Graham T., 4,715,228, Cl. 73-640.000.

Romanelli, Luciano. Set of standardized structural elements and accessories for the accomplishment of spatial and/or flat structures which can be combined to delimit habitable spaces in an industrialized building system. 4,715,160, Cl. 52-648.000.

Rome, Howard M. Process for preparing clam cutlet. 4,715,091, Cl. 17-48.000.

Romeo, Aurelio: *See*—
della Valle, Francesco; and Romeo, Aurelio, 4,716,223, Cl. 536-53.000.

Rood, Jerry A., to American Standard Inc. Antifriction thrust bearing for orbital motion. 4,715,733, Cl. 384-445.000.

Rook, Graham A. W.: *See*—
Stanford, John L.; Cohen, Irun R.; Frenkel, Ayala; Holoshitz, Joseph; van Eden, Willem; and Rook, Graham A. W., 4,716,038, Cl. 424-92.000.

Roos, William N., to Autotrol Corporation. Disengageable one-way mechanism for synchronous motors. 4,716,325, Cl. 310-41.000.

Rosati, Louis: *See*—
Casey, Donald J.; Jarrett, Peter K.; and Rosati, Louis, 4,716,203, Cl. 525-408.000.

Rosborough, John R.: *See*—
Guilford, Richard P.; and Rosborough, John R., 4,716,364, Cl. 324-127.000.

Rose, Jed E., to Univ. of California, The Regents of the. Aerosol for use in the reduction of tobacco smoking. 4,715,387, Cl. 131-270.000.

Rosemann, Thomas J. Rotary cutting cylinder and method of making same. 4,715,250, Cl. 76-101.00A.

Rosenberg, Avraham; and Ziner, Carol, to State of Israel, Ministry of Defence, Israel Military Industries, The. Cluster bomb grenade with means for spin rate attenuation. 4,715,282, Cl. 102-227.000.

Rosendahl Maschinen Gesellschaft m.b.H.: *See*—
Kerschbaum, Kurt; and Konicka, Alfred, 4,716,000, Cl. 264-83.000.

Rosenstock, Guenter: *See*—
Heinzl, Joachim; and Rosenstock, Guenter, 4,716,418, Cl. 346-1.100.

Rosenwald, Fred. Compensator for handguns and the like. 4,715,140, Cl. 42-97.000.

Rosman, Alan H., to Dynamic Hydraulic Systems, Inc. Hydraulic lift mechanism. 4,715,180, Cl. 60-372.000.

Ross, Stephen J.: *See*—
Anderson, Roy W.; Ross, Stephen J.; and Henderson, Larry D., 4,715,723, Cl. 366-142.000.

Rossmy, Gerd: *See*—
Gruning, Burghard; Holtschmidt, Ulrich; Koerner, Goetz; and Rossmy, Gerd, 4,715,986, Cl. 252-315.200.

Rossner, Hans. Dental articulator. 4,715,815, Cl. 433-60.000.

Rostin, Gunther; Tomm, Dagwin; and Hartig, Franz, to Fichtel & Sachs AG. Clutch disc for a motor vehicle friction clutch. 4,715,485, Cl. 192-106.200.

Roth, Bruce D.: *See*—
Hoefle, Milton L.; Holmes, Ann; and Roth, Bruce D., 4,716,175, Cl. 514-357.000.

Roth, Charles H., Jr.: *See*—
Kapoor, Anoop; Choby, Edward J.; Kramer, Thomas J.; Ranieri, James E.; Roth, Charles H., Jr.; Scheffer, Donald E.; Spehar, John E., Jr.; Bessko, Csaba; and Blumstein, Robert M., 4,715,111, Cl. 29-723.000.

Rothanavibhata, Adam A.; and Payne, Richard K., to Colgate Palmolive Co. Controlling viscosity of fabric softening heavy duty liquid detergent containing bentonite. 4,715,969, Cl. 252-8.700.

Rothschild, George E.: *See*—
Wallace, David R.; Rothschild, George E.; and Hamilton, Robert W., 4,715,074, Cl. 5-93.00R.

Roule, Richard L.; and Cantor, Joshua C., to American Bank Note Company. Documents having a revealable concealed identifier and the method of making such documents. 4,715,623, Cl. 283-91.000.

Roussel Uclaf: *See*—
Gero, Stephane; Cleophax, Jeanine; and Gateau-Olesker, Alice, 4,716,226, Cl. 540-200.000.

Roussin, Alfred G., to General Electric Company. Split drift ring for focus deflection in light valves. 4,716,339, Cl. 315-15.000.

Roust, Robert C., to STC PLC. Demodulation of auxiliary low frequency channels in digital transmission systems. 4,716,563, Cl. 370-110.400.

Routt, Wilson M., Jr.: *See*—
Glass, David W.; and Routt, Wilson M., Jr., 4,715,687, Cl. 350-345.000.

Rowcliffe, David J.: *See*—
Allam, Ibrahim M.; and Rowcliffe, David J., 4,715,902, Cl. 148-6.300.

Rowlett, Don C.: *See*—
Hallissy, Robert P.; Isakov, Edmund; Stephenson, Earle W.; and Rowlett, Don C., 4,715,450, Cl. 172-701.300.

RSF-Electronik Gesellschaft m.b.H.: *See*—
Rieder, Heinz; and Schwaiger, Max, 4,716,292, Cl. 250-237.00G.

RTE Corporation: *See*—
Schoenwetter, Randall R.; Makal, John; and Sankey, Edward L., 4,715,104, Cl. 29-271.000.

Rudavicius, Gabriel J., to Navistar International Transportation Corp. Fluid treatment pressure vessel with a disposable cartridge and valve therefor. 4,715,434, Cl. 165-119.000.

Rudolph, Johann, to Vacuumschmelze GmbH. Apparatus for covering metallic billets with aluminum. 4,715,207, Cl. 72-268.000.

Ruegg, Christoph; Voirol, Peter; Fuchs, Willi; and Meister, Hans U., to Ciba-Geigy Corporation. Connection between a plastics quill shaft and a metal element. 4,715,739, Cl. 403-30.000.

Ruhrkohle AG: *See*—
Langhoff, Josef; Krischke, Hermann; Geldmacher, Horst; Golomb, Manfred; Kamp, Karl-Heinz; Masuch, Peter; and Chalupnik, Rolf, 4,715,809, Cl. 431-170.000.

Rungz, Yung. Electrode structure for a cathode glow discharge system. 4,716,338, Cl. 313-619.000.

Ruppman, Kurt H.; and Prano, Charles A., to Plastic Recycling Inc. Apparatus and method for recycling plastic beverage containers. 4,715,920, Cl. 156-344.000.

Ruprecht, Hans-Dieter: *See*—
Trummelmeyer, Gerhard; and Ruprecht, Hans-Dieter, 4,716,210, Cl. 528-75.000.

Rushing, Frank C.; and Weixel, Mark, to United States of America, Air Force. Wire container. 4,715,557, Cl. 242-129.000.

Rusnica, Edward J.: *See*—
Ezekoye, L. Ike; Rusnica, Edward J.; and Sepp, Henry A., Jr., 4,716,005, Cl. 376-205.000.

Russ Bassett Company: *See*—
Baillie, William R.; Macias, Jorge; and Dressendorfer, Michael, 4,715,669, Cl. 312-12.000.

Rustad, Mark A.: *See*—
Scherrer, Robert A.; and Rustad, Mark A., 4,716,178, Cl. 514-563.000.

Ruys, Hendrik J.: *See*—
Lapeyre, George C.; Greve, Christopher G.; and Ruys, Hendrik J., 4,715,093, Cl. 17-71.000.

RVF Corporation: *See*—
Franklin, Randall M., 4,715,499, Cl. 206-373.000.

Ryder, Steven W.; Shand, David G.; and Mullane, John F., to American Home Products Corporation. Tolrestat for inhibition of weight gain. 4,716,177, Cl. 514-524.000.

Rydzicki, Gregory J. Brush extension handle. 4,715,080, Cl. 15-146.000.

Ryo, U. Yun. Safety bottle and cap for the administration of liquid radioactive iodine. 4,715,359, Cl. 128-1.100.

Ryobi Limited: *See*—
Atsumi, Haruyuki; Anzai, Hisatugu; and Kasahara, Noboru, 4,715,146, Cl. 49-1.000.

Ryschka, Martin: *See*—
Altner, Ulrich; Falb, Wolfgang; Ryschka, Martin; and Wallroth, Carl-Friedrich, 4,715,370, Cl. 128-204.130.

S. C. Johnson & Son, Inc.: *See*—
Erdman, Constance E.; and Padden, Timothy J., 4,716,037, Cl. 424-70.000.

S. Himmelstein and Company: *See*—
Tveter, Richard S.; and Miller, Wayne A., 4,715,214, Cl. 73-49.200.

S R I International: *See*—
Allam, Ibrahim M.; and Rowcliffe, David J., 4,715,902, Cl. 148-6.300.

Saab-Scania Aktiebolag: *See*—
Werner, Hensel, 4,715,648, Cl. 296-198.000.

Saalasti, Vaino T. Mechanical continuous dewatering press. 4,715,276, Cl. 100-121.000.

SACE S.p.A. Costruzioni Elettromeccaniche: *See*—
Muscaglione, Giuseppe; and Talpo, Gianpietro, 4,716,266, Cl. 200-148.00R.

Sadao, Nagai: *See*—
Kaoru, Koide; and Sadao, Nagai, 4,715,814, Cl. 433-59.000.

Sagawa, Ryuichi; Nagata, Osamu; and Yamada, Hajime, to Kawasaki Jukogyo Kabushiki Kaisha. Governor for internal combustion engine. 4,715,339, Cl. 123-357.000.

Sage Products, Inc.: *See*—
Hanifl, Paul H., 4,715,498, Cl. 206-366.000.
Hanifl, Paul H.; and Newton, John J., Jr., 4,715,545, Cl. 241-169.100.

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Saito, Susumu: *See*—
Iijima, Takeo; Nomura, Hiroshi; Saito, Susumu; and Echizen, Susumu, 4,715,790, Cl. 417-269.000.

Saito, Takao: *See*—
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Sakae Tsushin Kogyo Co., Ltd.: *See*—
Shimoda, Eitaro, 4,716,395, Cl. 338-149.000.

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Shirafuji, Tamio; Sakai, Kiyomi; and Hirose, Ken-ichi, 4,716,253, Cl. 568-895.000.

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Sakamoto, Hiroshi; Torigoe, Toshihiro; and Yamaguchi, Tadashi, to Matsushita Electric Industrial Co., Ltd. Copying machine. 4,716,291, Cl. 250-318.000.

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Sakurai, Atsushi: *See*—
Mori, Shosuke; Sakurai, Atsushi; Aoki, Satoshi; and Suzuki, Tatsuya, 4,716,526, Cl. 364-200.000.

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Salatinjants, Aida. Method of treatment of malaria by one time interference. 4,716,173, Cl. 514-314.000.

Salensky, George A., to Union Carbide Corporation. Magnetic coating compositions from carboxylic acid-grafted phenoxy resins. 4,715,977, Cl. 252-62.540.

Salmon, Garland R., to Newton Instrument Company. Telephone equipment rack. 4,715,502, Cl. 211-26.000.

Salo, Eric A. Method and means for increasing energy output and thermal efficiency of an energy cycle such as the Rankine steam cycle. 4,715,185, Cl. 60-677.000.

Saltarelli, Robert: *See*—
Hawkins, Nicholas J.; and Saltarelli, Robert, 4,716,518, Cl. 364-184.000.

Salvail, Napoleon P. Apparatus for dispensing carbonated beverage from containers. 4,715,516, Cl. 222-153.000.

Salvisberg, Kurt: *See*—
Erni, Markus; and Salvisberg, Kurt, 4,715,550, Cl. 242-39.000.

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Kramer, S. Bertram; and Sampatacos, Evan P., 4,715,263, Cl. 89-37.210.

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Sanchez, William: *See*—
Sherman, Victor; Zborovsky, Ilya; and Sanchez, William, 4,715,357, Cl. 126-39.00H.

Sanden Corporation: *See*—
Harada, Tsutomu, 4,715,270, Cl. 99-289.00R.

Sanders, Anthony J., to Black & Decker Inc. Bearing assemblies for motors. 4,715,732, Cl. 384-320.000.

Sanders, John H.; Hoblit, Louis D.; and Mann, Joe A., to BASF Corporation. Conductive fiber and method of making same. 4,716,055, Cl. 427-304.000.

Sandoz Ltd.: *See*—
Avar, Lajos, 4,716,187, Cl. 524-99.000.

Sandoz Pharm. Corp.: *See*—
Rogoff, Martin H.; and Shieh, Tsuong R., 4,716,039, Cl. 424-93.000.

Sanislo, Stephen V., Jr.: *See*—
Blanchard, Kenneth E.; and Sanislo, Stephen V., Jr., 4,716,582, Cl. 379-28.000.

Sankey, Edward L.: *See*—
Schoenwetter, Randall R.; Makal, John; and Sankey, Edward L., 4,715,104, Cl. 29-271.000.

Sankyo Company Limited: *See*—
Nakao, Hideo; Fujimoto, Koichi; Ishihara, Sadao; Sugawara, Shinichi; and Igarashi, Isamu, 4,716,158, Cl. 514-202.000.
Tomita, Kuniyuki; Shimoji, Yasuo; Kumakura, Seiji; Koike, Hiroyuki; Iwata, Nobuyoshi; and Morisawa, Yasuhiro, 4,716,162, Cl. 514-234.000.

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Sano, Kazuo: *See*—
Makabe, Eiichi; Uesugi, Mitsuaki; Inomata, Masaichi; Maruyama, Kyusuke; Iwai, Kenji; and Sano, Kazuo, 4,716,459, Cl. 358-106.000.

Sansui Electric Co., Ltd.: *See*—
Takahashi, Susumu; and Iida, Hiroshi, 4,716,590, Cl. 381-15.000.

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Motegi, Akio; and Saito, Takao, 4,716,276, Cl. 219-253.000.

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Otani, Kiyoshi, 4,716,557, Cl. 369-32.000.

Sarang, Gursharan S.: *See*—
Thorpe, John E.; and Sarang, Gursharan S., 4,715,116, Cl. 29-846.000.

Saraswat, Krishna: *See*—
Moslehi, Mehrdad M.; Fu, Chi Y.; and Saraswat, Krishna, 4,715,937, Cl. 204-177.000.

Sarazen, Paul M.: *See*—
Sarazen, Paul M., Jr.; and Beam, Dennis A., 4,715,532, Cl. 236-49.000.

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Sasaguri, Nobuya: *See*—
Minami, Takao; Nagano, Hiroo; Yamanaka, Kazuo; Okada, Yasutaka; Susukida, Hiroshi; Onimura, Kichiro; Yonezawa, Toshio; and Sasaguri, Nobuya, 4,715,909, Cl. 148-410.000.

Sasahara, Hitoshi: *See*—
Ota, Masanori; and Sasahara, Hitoshi, 4,715,983, Cl. 252-186.350.

Sasaki, Eiichi: *See*—
Nakamura, Ichiro; Kobayashi, Satoshi; and Sasaki, Eiichi, 4,715,478, Cl. 187-111.000.

Sasaki, Itsuo: *See*—
Matsuo, Kenji; Sasaki, Itsuo; Suzuki, Hiroaki; and Kunieda, Mitsuyuki, 4,716,308, Cl. 307-303.000.

Sasaki, Shinichi: *See*—
Ogawa, Hiroshi; Miyazaki, Yasuyuki; Yoshida, Susumu; and Sasaki, Shinichi, 4,716,530, Cl. 364-424.000.

Sata, Toshikatsu; Katsube, Teruaki; and Iida, Yoshiya, to Tokuyama Soda Kabushiki Kaisha. Electrochromic display using bipolar ion-exchange membrane. 4,715,691, Cl. 350-357.000.

Satellite Technology Services, Inc.: *See*—
Smith, Edward W.; and Garfinkle, Gene, 4,716,416, Cl. 343-915.000.

Sato, Atsushi; Kawakami, Shigenobu; Endo, Keiji; and Dohi, Hideyuki, to Nippon Petrochemicals Company, Limited. Oil-impregnated capacitor. 4,716,084, Cl. 428-458.000.

Sato, Hiroshi; and Kobayashi, Yoshihito, to Takeda Riken Co., Ltd. IC test equipment. 4,715,501, Cl. 209-573.000.

Sato, Kimiaki: *See*—
Nakano, Masao; Takemae, Yoshihiro; Nakano, Tomio; Nozaki, Shigeki; Sato, Kimiaki; and Kodama, Nobumi, 4,716,549, Cl. 365-203.000.

Sato, Koji; Kuroda, Hiroshi; Yamada, Ryuji; and Serino, Mamoru, to Zaidan Hojin Sekitan Gijutsu Kenkyusho; Mitsui Sekitan Kogyo Kabushiki Kaisha; and Kabushiki Kaisha Mitsui Miike Seisakusho. Double ranging drum cutter having bedrock sensor based on video image processing system. 4,715,657, Cl. 299-1.000.

Sato, Kozo: *See*—
Yabuki, Yoshiharu; Sato, Kozo; Kawata, Ken; and Hirai, Hiroyuki, 4,716,100, Cl. 430-570.000.

Sato, Michitaka: *See*—
Kawasaki, Kiyohito; Sato, Michitaka; Koseki, Hiroyuki; and Matsunuma, Tamotsu, 4,715,419, Cl. 152-527.000.

Sato, Naoki; Kamo, Yoshihisa; Katoh, Yasuhiro; Kosuge, Minoru; and Arai, Shinichi, to Hitachi, Ltd. Circuit for detecting variation of resistance of a variable-resistance element. 4,716,306, Cl. 307-296.00R.

Sato, Noriko; and Suzuki, Masayuki, to Kabushiki Kaisha Toshiba. Method of determining degree of embrittlement of low alloy steel. 4,715,218, Cl. 73-86.000.

Sato, Reijiro: *See*—
Minonishi, Kuniaki; and Sato, Reijiro, 4,716,094, Cl. 430-284.000.

Sato, Tadashi: *See*—
Ohno, Yasunori; Kurosawa, Tomoe; Sato, Tadashi; and Ohshita, Youichi, 4,716,491, Cl. 361-230.000.

Sato, Takashi; Kubo, Emiko; and Kayashima, Takako, to Fujirebio Kabushiki Kaisha. Assaying anti-TP IgM antibodies for syphilis diagnosis. 4,716,108, Cl. 435-7.000.

Sato, Yasuhisa: *See*—
Yamada, Yasuyuki; Fujibayashi, Kazuo; Sato, Yasuhisa; and Yokota, Hideo, 4,715,692, Cl. 350-422.000.

Satoh, Kazuhiro: *See*—
Ozawa, Naoki; Akiyama, Toshiyuki; Satoh, Kazuhiro; Nagahara, Syusaku; and Mimura, Itaru, 4,716,455, Cl. 358-44.000.

Sauer S.p.A.: *See*—
Curti, Carlo, 4,715,193, Cl. 62-345.000.

Saunders, Arthur F.; and Eccles, Edward S., to Dowty and Smiths Industries Controls Limited; and Smiths Industries Public Limited Company. Two lane engine control system. 4,716,531, Cl. 364-431.020.

Saunders, Philip G.: *See*—
Cooper, Larry L.; and Saunders, Philip G., 4,716,096, Cl. 430-323.000.

Savigny, James G., to Ag-Pak, Inc. Bagger machine. 4,715,167, Cl. 53-572.000.

Savoye, Eugene D., to RCA Corporation. Interrupting charge integration in semiconductor imagers exposed to radiant energy. 4,716,447, Cl. 357-24.000.

Sawada, Daisaku: *See*—
Shigematsu, Takashi; Watanabe, Tomoyuki; Tokoro, Setsuo; and Sawada, Daisaku, 4,715,258, Cl. 74-866.000.

Scanlon, John F.: *See*—
Nelson, Jeffrey D.; and Scanlon, John F., 4,715,262, Cl. 89-36.020.

Scarponi, Ugo; Lazzarini, Anna M.; Toti, Daniela; and de Castiglione, Roberto, to Farmitalia Carlo Erba S.p.A. Condensed 2-substituted thiazole derivatives. 4,716,228, Cl. 540-578.000.

Scatena, Alessandro. Cushion system for shoes. 4,715,130, Cl. 36-27.000.

Schacher, Alfred: *See*—
Eggimann, Bernhard; Hochuli, Erich; and Schacher, Alfred, 4,716,219, Cl. 530-413.000.

Schaible, Siegfried; Wolfle, Hans-Peter; Gusewell, Eike; and Kohl, Bernhard, to Klockner-Humboldt-Deutz AG Zweigniederlassung Fahr. Binder-twine guide and cutter mechanism for roll-baler. 4,715,175, Cl. 56-432.000.

Schaller, Klaus: *See*—
Kruger, Bernd-Wieland; Lockhoff, Oswald; Metzger, Karl G.; Opitz, Hans-Georg; Schaller, Klaus; Stunkel, Klaus G.; and Zeiler, Hans-Joachim, 4,716,152, Cl. 514-25.000.

Scheefers, Hans, to Organogen Medizinisch-Molekularbiologische Forschungsgesellschaft m.b.H. Carrier material for use in immune determinations. 4,716,122, Cl. 436-532.000.

Scheel, Hartmut: *See*—
Asten, Wolfgang V.; Dorner, Karl H.; Scheel, Hartmut; and Wurstle, Volker, 4,715,903, Cl. 148-11.50A.

Scheffer, Donald E.: *See*—
Kapoor, Anoop; Choby, Edward J.; Kramer, Thomas J.; Ranieri, James E.; Roth, Charles H., Jr.; Scheffer, Donald E.; Spehar, John E., Jr.; Bessko, Csaba; and Blumstein, Robert M., 4,715,111, Cl. 29-723.000.

Scheffler, Ingolf: *See*—
Duck, Edward W.; and Scheffler, Ingolf, 4,716,070, Cl. 428-192.000.

Schelhas, Klaus-Dieter; and Biehl, Gerd, to Orthoplant Endoprothetik GmbH. Hip cup for a hip joint acetabular prosthesis. 4,715,859, Cl. 623-22.000.

Scheller, James I. Apparatus for washing vehicles. 4,715,391, Cl. 134-57.00R.

Schellhamer, Alan J.; Barnett, Daniel J.; and Khan, Abdul Q., to Betz Laboratories, Inc. Process for inhibiting aluminum hydroxide deposition in papermaking felts. 4,715,931, Cl. 162-199.000.

Schelm, Sandra L., to Colgate-Palmolive Company. Packaged dental cream. 4,716,034, Cl. 424-49.000.

Schelm, Sandra L., to Colgate-Palmolive Company. Stabilized dental cream containing vegetable oil. 4,716,036, Cl. 424-57.000.

Schema, Anthony C., to Truth Incorporated. Telescoping pole crank assembly. 4,715,089, Cl. 16-115.000.

Scherrer, Robert A.; and Rustad, Mark A., to Riker Laboratories, Inc. Substituted di-t-butylphenols. 4,716,178, Cl. 514-563.000.

Scheuble, Bernhard: *See*—
Krause, Joachim; Wachtler; and Scheuble, Bernhard, 4,715,984, Cl. 252-299.610.

Scheuermann, Helmut, to ANT Nachrichtentechnik GmbH. Circuit arrangement for simulating a resistive elementary two port device for use in a wave digital filter. 4,716,537, Cl. 364-724.000.

Scheve, William J. Illuminated display with beaded light-transmitting image. 4,715,137, Cl. 40-546.000.

Schick, Gerald: *See*—
Baumann, Karl-Heinz; Schick, Gerald; Kassing, Lothar; Bossenmaier, Alban; and Brambilla, Luigi, 4,715,468, Cl. 180-271.000.

Schilling Helmut W.: *See*—
Andrich, Wolfgang; and Schilling Helmut W., 4,716,300, Cl. 250-578.000.

Schilling, Lothar: *See*—
Busch, Edgar; Schilling, Lothar; and Ziegler, Klaus, 4,715,303, Cl. 112-256.000.

Schindler, Manfred; and Ficht, Reinhold, to Ficht GmbH. Four-stroke internal combustion piston engine. 4,715,336, Cl. 123-56.0BC.

Schlegel Corporation: *See*—
Rohrman, Henry, 4,715,153, Cl. 52-213.000.

Schlegel, Dallas E.: *See*—
Jackson, Mark F.; Lawrul, Stephen P.; Schlegel, Dallas E.; and Spong, Richard V., 4,713,112, Cl. 29-739.000.

Schlegel, Susan L.: *See*—
Dilling, Peter; and Schlegel, Susan L., 4,715,864, Cl. 8-557.000.

Schlogel jun., Rudolf: *See*—
Werba, Hans; and Schlogel jun., Rudolf, 4,716,397, Cl. 340-347.0AD.

Schmanski, Donald W. Mobility guide tile for visually handicapped. 4,715,743, Cl. 404-9.000.

Schmid, Franz: *See*—
Ploppa, Jurgen; and Schmid, Franz, 4,715,198, Cl. 66-75.200.

Schmid, Steven R.; Ansel, Robert E.; and Murray, Kevin P., to DeSoto, Inc. Strong and elastic polyurethane polyurea polyacrylates and electron beam-cured coatings containing the same. 4,716,209, Cl. 526-261.000.

Schmidt, Alfred, to Ing. Alfred Schmidt GmbH. Rotary snow plough. 4,715,134, Cl. 37-238.000.

Schmidt, Harald: *See*—
Freudenschuss, Otto; Herdin, Gunther; Schmidt, Harald; and Schreiner, Emerich, 4,715,541, Cl. 239-533.400.
Morell, Josef; Freudenschuss, Otto; and Schmidt, Harald, 4,715,542, Cl. 239-533.900.

Schmidt, Helmut: *See*—
Dislich, Helmut; Arfsten, Nanning J.; Schmidt, Helmut; Philipp, Gottfried; and Tuenker, Gerhard, 4,715,999, Cl. 264-1.100.

Schmidt, James K.: *See*—
Ahearn, John E.; Frates, Raymond A.; Girard, Dennis, Koepke, Richard A.; Schmidt, James K.; and Manon, C. Dodd, 4,716,082, Cl. 428-428.000.

Schmidt, Manfred; and Fenicle, Theodore W., to Bethlehem Steel Corporation. Continuous caster tundish having wall dams. 4,715,586, Cl. 266-275.000.

Schmidt, Rainer: *See*—
Hecker, Erich; Osswald, Hans; and Schmidt, Rainer, 4,716,179, Cl. 514-691.000.

Schmitt, Ralph H.: *See*—
Gilanyi, Robert A.; and Schmitt, Ralph H., 4,716,525, Cl. 364-200.000.

Schmitte, Franz-Josef; Muller, Dieter; and Groth, Rolf. Method for the manufacture of a tempered and/or curved glass pane with reduced transmission. 4,715,879, Cl. 65-60.200.

Schnippering, Friedhelm; and Rodder, Karl-Martin, to Dynamit Nobel AG. Method of producing molds for the casting of metal. 4,715,895, Cl. 106-38.300.

Schoeffler, William N.: *See*—
Falgout, Thomas E., Sr.; and Schoeffler, William N., 4,715,253, Cl. 81-57.140.
Falgout, Thomas E., Sr.; and Schoeffler, William N., 4,715,453, Cl. 175-73.000.

Schoen, William R.: *See*—
Parsons, William H.; Schoen, William R.; Patchett, Arthur A.; and Taniguchi, Masao, 4,715,994, Cl. 260-502.50E.

Schoenwetter, Randall R.; Makal, John; and Sankey, Edward L., to RTE Corporation. Installation tool. 4,715,104, Cl. 29-271.000.

Schon, Detlef: *See*—
Bringmann, Udo; Drews, Klaus; and Schon, Detlef, 4,715,319, Cl. 118-723.000.
Schott Glaswerke: *See*—
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Schott, Lawrence A.: *See*—
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Schott, Roger A.; and Schott, Lawrence A., to Freedom Industries, Inc. Handlebar safety light. 4,716,502, Cl. 362-72.000.
Schreder, Felix, to E.G.O. Elektro-Gerate Blanc und Fischer. Electric hotplate. 4,716,277, Cl. 219-449.000.
Schreiber, William L.: *See*—
Fujioka, Futoshi; Boden, Richard M.; and Schreiber, William L., 4,715,981, Cl. 252-174.110.
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Freudenschuss, Otto; Herdin, Gunther; Schmidt, Harald; and Schreiner, Emerich, 4,715,541, Cl. 239-533.400.
Schubert, Peter J.; and Alvi, Nadeem S., to General Motors Corporation. Method of fabricating silicon-on-insulator like devices. 4,716,128, Cl. 437-41.000.
Schuh, Frank J.: *See*—
Bseisu, Amjad A.; Jan, Yih-Min; and Schuh, Frank J., 4,715,451, Cl. 175-40.000.
Schulte, Richard R. Remote steering assembly kit for outboard trolling motors. 4,715,836, Cl. 440-6.000.
Schultz, Jerold M.: *See*—
Fakirov, Stoyko C.; and Schultz, Jerold M., 4,715,919, Cl. 156-307.300.
Schulz, Dietmar; Pohl, Peter; and Johnson, Alfred H., to Siemens Aktiengesellschaft; and IBM. Light-wave guide-plug connection. 4,715,674, Cl. 350-96.210.
Schulz, Donald N.: *See*—
Kitano, Kissho; Duvdevani, Ilan; and Schulz, Donald N., 4,715,865, Cl. 44-7.300.
Schulz, Wolfgang: *See*—
Kleemann, Axel; Klenk, Herbert; and Schulz, Wolfgang, 4,716,247, Cl. 564-18.000.
Schulze, Michael, to U.S. Philips Corporation. Method and circuit arrangement for increasing the signal-to-noise ratio of a periodical electrical signal. 4,716,373, Cl. 328-165.000.
Schundehutte, Karl H.: *See*—
Klauke, Erich; Baasner, Bernd; and Schundehutte, Karl H., 4,716,229, Cl. 544-334.000.
Schurch, Richard C., to BMC Manufacturing Inc. Collapsible container. 4,715,508, Cl. 220-7.000.
Schurter, Rolf: *See*—
Lukaszczyk, Alfons; Martin, Henry; Diel, Peter J.; Fory, Werner; Gotzi, Karl; Kristinsson, Haukur; Muller, Beat; Muntwyler, Rene ; Pachlatko, Johannes P.; Rempfler, Hermann; Schurter, Rolf; and Szczepanski, Henry, 4,715,883, Cl. 71-90.000.
Schutt, Karl: *See*—
Reichert, Ernst; and Schutt, Karl, 4,715,745, Cl. 405-262.000.
Schutten, Evert D.; and Verlijsdonk, Johannus G., to U.S. Philips Corporation. Luminescent screen and low-pressure mercury vapor discharge lamp provided with such a screen. 4,716,335, Cl. 313-486.000.
Schutten, Evert D.; and Verlijsdonk, Johannus G., to U.S. Philips Corporation. Luminescent screen and low-pressure mercury vapor discharge lamp provided with such a screen. 4,716,336, Cl. 313-486.000.
Schutten, Evert D.: *See*—
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Schwank, Johannes: *See*—
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Schwarz, Alexander; Kalb, Charles E.; and Goebel, Charles C., to Air Products and Chemicals, Inc. Reboiler-condenser with boiling and condensing surfaces enhanced by extrusion. 4,715,431, Cl. 105-110.000.
Schwarz, Alexander; and Kalb, Charles E., to Air Products and Chemicals, Inc. Reboiler-condenser with doubly-enhanced plates. 4,715,433, Cl. 165-110.000.
Schwertner, Dan R.: *See*—
Poe, Frank E., Jr.; Schwertner, Dan R.; Dunn, Cooper L.; and Whitby, Melvyn F., 4,715,456, Cl. 175-423.000.
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Robbins, Edward S., III; and Schwertner, Gary T., 4,715,572, Cl. 248-101.000.
Science Applications International Corporation: *See*—
Yengst, William C., 4,715,283, Cl. 102-401.000.
Scifres, Donald R.; Cross, Peter; and Harnagel, Gary L., to Spectra Diode Laboratories, Inc. Stacked diode laser array assembly. 4,716,568, Cl. 372-36.000.
Sclufer, Nicholas. Magnethoydrodynamic electrical power generation. 4,716,324, Cl. 310-11.000.
Scott, David W.: *See*—
Bishop, Arthur E.; Roeske, Klaus J.; and Scott, David W., 4,715,210, Cl. 72-400.000.
Scott, Henry. Ambulatory lumbo-sacral traction systems and methods. 4,715,362, Cl. 128-75.000.
Scully, Andrew J., to United States of America, Army. Tiedown assembly. 4,715,754, Cl. 410-107.000.
Scymanski, Gerald L.; Mossaad, Amgad S.; and Hussain, Saadat, to Ethyl Corporation. Diaryloxyalkane bromination process. 4,716,251, Cl. 568-645.000.
Seagate Technology: *See*—
Wiens, John P.; and Jue, Clifford T., 4,716,480, Cl. 360-105.000.
Secker, Jeffrey R.: *See*—
Demario, Edmund E.; Burman, Denis L.; Olson, Carl A.; and Secker, Jeffrey R., 4,716,016, Cl. 376-446.000.
Segarra, Juan B. M. Positioning device for the installation of door frames, window frames or the like. 4,715,590, Cl. 269-76.000.
Segger, Bernd, to Siemens Aktiengesellschaft. Primary switched-mode power supply unit. 4,716,488, Cl. 361-88.000.
Seifried, Walter; and Crass, Guenther, to Hoechst Aktiengesellschaft. Polypropylene adhesive tape. 4,716,068, Cl. 428-141.000.
Seikagaku Kogyo Co. Ltd.: *See*—
Sakurai, Katukiyo; Ueno, Yoshio; and Okuyama, Takashi, 4,716,224, Cl. 536-55.100.
Seiken Co., Ltd.: *See*—
Takeuchi, Masatoshi; and Hamagaki, Takayasu, 4,715,150, Cl. 51-395.000.
Seiko Epson Corporation: *See*—
Iwashita, Yukihiro; and Okumura, Hideaki, 4,715,686, Cl. 350-339.00R.
Kawamura, Yoshikazu; Hosokawa, Minoru; Okazaki, Sakiho; and Ishii, Hiroshi, 4,715,725, Cl. 368-157.000.
Seiko Epson Kabushiki Kaisha: *See*—
Morozumi, Shinji, 4,716,403, Cl. 340-702.000.
Seiko Instruments & Electronics Ltd.: *See*—
Ishimaru, Hajime; Miyamoto, Masao; and Komaki, Shojiro, 4,715,186, Cl. 62-45.000.
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Harada, Takamasa; Tagushi, Masaaki; and Iwasa, Koji, 4,715,688, Cl. 350-350.00S.
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Steilen, Ronald M., to Deere & Company. Hopper and metering mechanism structure for an agricultural implement. 4,715,515, Cl. 222-143.000.
Steinberg, Amiram. Hydrofoil marine apparatus. 4,715,304, Cl. 114-39.200.
Steinkuhl, Bernd: *See*—
Rassmann, Christoph; Nickel, Gerhard; Steinkuhl, Bernd; Merten, Gerhard; and Pfefferle, Egon, 4,715,659, Cl. 299-43.0'0.
Steltenkamp, Robert J.; and Camara, Michael A., to Colgate-Palmolive Company. Wash cycle fabric conditioning composition, process for manufacture of such composition, and method of use thereof. 4,715,862, Cl. 8-137.000.
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Stephany, Thomas M., to Eastman Kodak Company. Exposure control apparatus. 4,716,432, Cl. 354-446.000.
Stephenson, Earle W.: *See*—
Hallissy, Robert P.; Isakov, Edmund; Stephenson, Earle W.; and Rowlett, Don C., 4,715,450, Cl. 172-701.300.
Sterling Drug Inc.: *See*—
Lesher, George Y.; and Singh, Baldev, 4,716,170, Cl. 514-300.000.
Stevens, Timothy S.: *See*—
Coyne, Brenton S.; Strandjord, Andrew J.; Spence, Mark W.; Willis, Reid S.; Bredeweg, Robert A.; and Stevens, Timothy S., 4,715,217, Cl. 73-61.10C.
Stevens, Udo: *See*—
Neven, Jozef H. M.; Poortman, Boodewijn J.; Tromp, Wouter T.; and Stevens, Udo, 4,715,233, Cl. 73-871.120.
Stewart, Russell M.; and Gomes, Rodney A. Reusable remailable envelope. 4,715,531, Cl. 229-73.000.
Steyr-Daimler-Puch AG: *See*—
Freudenschuss, Otto; Herdin, Gunther; Schmidt, Harald; and Schreiner, Emerich, 4,715,541, Cl. 239-533.400.
Morell, Josef; Freudenschuss, Otto; and Schmidt, Harald, 4,715,542, Cl. 239-533.900.
Stiefel, Paul: *See*—
Wolff, Donald L.; McCauley, Porter T.; Stiefel, Paul; Takacs, Gyoergy J.; and Adams, Roman A., 4,715,786, Cl. 417-22.000.
Stiftung Deutches Krebsforschungszentrum: *See*—
Hecker, Erich; Osswald, Hans; and Schmidt, Rainer, 4,716,179, Cl. 514-691.000.
Stirling Thermal Motors, Inc.: *See*—
Meijer, Roelf J.; and Ziph, Benjamin, 4,715,183, Cl. 60-524.000.
Stitz, Olaf: *See*—
Kuhn, Heinrich; Stitz, Olaf; and Wimmer, Karl, 4,716,572, Cl. 373-88.000.
Stobb, Inc.: *See*—
Stobb, Walter J., 4,715,758, Cl. 412-8.000.
Stobb, Walter J., to Stobb, Inc. Method and apparatus for attaching sheets together. 4,715,758, Cl. 412-8.000.
Stocker, Raymond, to Ford Motor Company. Carburetor throttle lever/speed control connector. 4,715,738, Cl. 403-24.000.
Stoddart, David E.: *See*—
Boxell, Timothy G.; Bardsley, Frank B.; and Stoddart, David E., 4,715,440, Cl. 166-100.000.
Stokes, Robert B.: *See*—
Elliott, Jeffrey H.; Stokes, Robert B.; Penunuri, David; and Yen, Kuo-Hsiung, 4,716,390, Cl. 333-202.000.
Stoll, Kurt. Piston and cylinder unit. 4,715,264, Cl. 91-16.000.
Stone, Thomas W., to Universal Electric Company. Electric motor bearing. 4,716,327, Cl. 310-90.000.
Stoner, Arthur L., to Wilbur Curtis Company, Inc. Coffee maker with plastic decanter and low temperature warming plate. 4,715,269, Cl. 99-279.000.
Strand, Jerome E., to Minnesota Mining and Manufacturing Company. Flat biomedical electrode with reuseable lead wire. 4,715,382, Cl. 128-640.000.
Strandjord, Andrew J.: *See*—
Coyne, Brenton S.; Strandjord, Andrew J.; Spence, Mark W.; Willis, Reid S.; Bredeweg, Robert A.; and Stevens, Timothy S., 4,715,217, Cl. 73-61.10C.
Strausburg, Larry D., to Monarch Marking Systems, Inc. Hand-held tag attacher. 4,715,521, Cl. 227-67.000.
Strauss, Howard W., to Du Pont de Nemours, E. I., and Company. Preparation of aluminum ionomers of carboxylic acid copolymers. 4,716,202, Cl. 525-370.000.
Stribel GmbH: *See*—
Stribel, Hans P., 4,715,822, Cl. 439-74.000.
Stribel, Hans P., to Stribel GmbH. Electrical connection device for a motor vehicle. 4,715,822, Cl. 439-74.000.
Stroppiana, Robert J., to U.S. Philips Corporation. Static relay for low DC voltages. 4,716,309, Cl. 307-442.000.
Stump Bohr GmbH: *See*—
Reichert, Ernst; and Schutt, Karl, 4,715,745, Cl. 405-262.000.
Stunkel, Klaus G.: *See*—
Kruger, Bernd-Wieland; Lockhoff, Oswald; Metzger, Karl G.; Opitz, Hans-Georg; Schaller, Klaus Stunkel, Klaus G.; and Zeiler, Hans-Joachim, 4,716,152, Cl. 514-25.000.
Suciu, Gabriel L., to United Technologies Corporation. Bleed valve for axial flow compressor. 4,715,779, Cl. 415-144.000.
Suda, Yasuo: *See*—
Akashi, Akira; Ohmura, Hiroshi; Ishizaki, Akira; Ohtaka, Keiji; and Suda, Yasuo, 4,716,282, Cl. 250-201.000.
Sudmann, Jurgen-Peter. Shower barrier. 4,715,072, Cl. 4-607.000.
Sueda, Akihiro: *See*—
Kondoh, Hitoshi; and Sueda, Akihiro, 4,716,452, Cl. 357-68.000.
Suga, Nagaichi; and Chaki, Kiyoshi. Rhombic-shaped scale device for use in judging discoloration, fading or staining. 4,715,716, Cl. 356-421.000.
Sugawara, Sakuo: *See*—
Umemura, Hiroyuki; Matsuda, Kenji; Tezuda, Tomofumi; Isono, Kazuaki; Ishioka, Hidenori; Sugawara, Sakuo; and Hara, Masanori, 4,715,191, Cl. 62-208.000.
Sugawara, Shinichi: *See*—
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Sugerman, Gerald; and Monte, Salvatore J., to Kenrich Petrochemicals Inc. Non-blooming antistatic agents. 4,715,968, Cl. 252-8.600.
Sughrue, Edward L., II; Kukes, Simon G.; and Hogan, Robert J., to Phillips Petroleum Company. Improving the life of a catalyst used to process hydrocarbon containing feed streams. 4,715,948, Cl. 208-251.00H.
Sugihara, Masahiro: *See*—
Inaba, Tsutomu; Kimura, Tadashi; Kobayashi, Norihide; Sugihara, Masahiro; and Matsugi, Tetsuzo, 4,715,796, Cl. 418-55.000.
Sugimoto, Junichi: *See*—
Ito, Takaaki; Mori, Eiji; Uranishi, Koji; Miyazaki, Shinji; and Sugimoto, Junichi, 4,715,509, Cl. 220-86.00R.
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Sugita, Naoki: *See*—
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Sugiura, Hiroyuki, to Diesel Kiki Co., Ltd. Oil returning mechanism of evaporator for air conditioner. 4,715,196, Cl. 62-468.000.
Sugiyama, Kiyoshi; and Nakamura, Kotaro, to Toshiba Kikai Kabushiki Kaisha. Machine tool capable of changing worn cutting tools, such as small diameter drills, with new ones. 4,715,108, Cl. 29-568.000.
Sugiyama, Makoto; Sugimura, Hiroshi; Machida, Naoyoshi; and Murai, Yoshiichi, to Kai Cutlery Center Co., Ltd. Grip scissors. 4,715,121, Cl. 30-253.000.
Sugiyama, Tadashi: *See*—
Inoue, Yuji; Iwaoka, Hideto; and Sugiyama, Tadashi, 4,716,370, Cl. 324-319.000.
Sugiyasu Industries Co., Ltd.: *See*—
Suzuki, Koichi, 4,715,477, Cl. 187-8.470.
Sullivan, F. Ryan; and Aleksa, David M., to B.F. Goodrich Company, The. Coating for EMI shielding. 4,715,989, Cl. 252-512.000.
Sulzer Brothers Limited: *See*—
Griffith, John D., 4,715,410, Cl. 139-434.000.
Suma, Tetsuro, to Sony Corporation. Error concealing system for digital data. 4,716,565, Cl. 371-31.000.
Sumita, Yukio: *See*—
Morishita, Masataka; Ono, Masaru; and Sumita, Yukio, 4,716,153, Cl. 514-30.000.
Sumitomo Chemical Company, Limited: *See*—
Shirafuji, Tamio; Sakai, Kiyomi; and Hirose, Ken-ichi, 4,716,253, Cl. 568-895.000.
Sumitomo Electric Industries, Ltd.: *See*—
Nishimura, Masayuki; Suzuki, Shuzo; and Yokoto, Hiroshi, 4,715,695, Cl. 350-96.310.
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Sumitomo Electric Research Triangle, Inc.: *See*—
Saito, Yasunori; and DeAngeles, John, 4,715,677, Cl. 350-96.230.
Sumitomo Heavy Industries, Ltd.: *See*—
Takahashi, Mitsuo, 4,715,804, Cl. 425-141.000.
Sumitomo Metal Industries, Ltd.: *See*—
Minami, Takao; Nagano, Hiroo; Yamanaka, Kazuo; Okada, Yasutaka; Susukida, Hiroshi; Onimura, Kichiro; Yonezawa, Toshio; and Sasaguri, Nobuya, 4,715,909, Cl. 148-410.000.
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Byrd, William A.; and Smith, Anthony R., 4,715,244, Cl. 74-467.000.
Nelson, Jeffrey D.; and Scanlon, John F., 4,715,262, Cl. 89-36.020.
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Bussiere, Ronald L.; and Smith, Robert J., 4,716,296, Cl. 250-504.00H.
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Sutehall, Ralph; and Clarke, Robert S. F., to STC plc. Optical fiber cable. 4,715,676, Cl. 350-96.230.
Sutin, Gordon L.: *See—*
Galgana, Russell J.; Mahoney, Patrick F.; and Sutin, Gordon L., 4,715,763, Cl. 414-216.000.
Sutter, Leroy V., Jr.: *See—*
Philippbar, Jay E.; Smith, Chadwick F.; and Sutter, Leroy V., Jr., 4,715,372, Cl. 128-303.100.
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Suzuki, Akira: *See—*
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Suzuki, Hiroaki: *See—*
Matsuo, Kenji; Sasaki, Itsuo; Suzuki, Hiroaki; and Kunieda, Mitsuyuki, 4,716,308, Cl. 307-303.000.
Suzuki, Koichi, to Sugiyasu Industries Co., Ltd. Device for fixing swing arm used for apparatus for lifting automobiles for repair. 4,715,477, Cl. 187-8.470.
Suzuki, Masayuki: *See—*
Kawamura, Masaharu; Harada, Yoshihito; Kobayashi, Ryuichi; Suzuki, Masayuki; Ohara, Tsunemasa; and Tosaka, Yoichi, 4,716,428, Cl. 354-173.110.
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Suzuki, Shuzo: *See—*
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Suzuki, Tatsuya: *See—*
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Suzuki, Yoshiki; Ikura, Hiroshi; Yamashita, Gentaro; and Nagai, Tsuneji, to Teijin Limited. Method of treating an injured part on the oral mucosa and the covering material for use thereof. 4,715,369, Cl. 128-156.000.
Svecia Silkscreen Maskiner AB: *See—*
Ericsson, Sylve J. D., 4,715,278, Cl. 101-123.000.
Swenson, Clark E.: *See—*
Gallo, Frank G.; Swenson, Clark E.; Bencloski, William A.; Cassette, Angelo J.; Manno, John L.; and Parlak, Edward A., 4,716,010, Cl. 376-260.000.
Swift, Jeffery G. Expansible object. 4,715,840, Cl. 446-74.000.
Swinmurn, C. John: *See—*
Gamarra, Jose P.; and Swinmurn, C. John, 4,716,183, Cl. 522-80.000.
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Lukaszczyk, Alfons; Martin, Henry; Diel, Peter J.; Fory, Werner; Gotzi, Karl; Kristinsson, Haukur; Muller, Beat; Muntwyler, Rene ; Pachlatko, Johannes P.; Rempfler, Hermann; Schurter, Rolf; and Szczepanski, Henry, 4,715,883, Cl. 71-90.000.
Szlaga, Emil, to Stant Inc. Flow control valve. 4,715,403, Cl. 137-493.200.
Ta Triumph-Adler Aktiengesellschaft: *See—*
Pamler, Gerhard, 4,715,734, Cl. 400-56.000.
Tabata, Junichi, to Kabushiki Kaisha Daini Seikosha. Pulsimeter. 4,715,384, Cl. 128-706.000.
Tabata, Kuniaki; and Tsuhara, Susumu, to Hitachi, Ltd. Image retrieval method and apparatus using annotations as guidance information. 4,716,404, Cl. 340-723.000.
Tachi-S Co., Ltd.: *See—*
Yajima, Yutaka, 4,715,114, Cl. 29-809.000.
Tachikawa Spring Co., Ltd.: *See—*
Shimada, Makoto, 4,715,916, Cl. 156-245.000.
Tack, Hans, to Fried. Krupp Gesellschaft mit beschrankter Haftung. Tool-head/tool-holder coupling. 4,715,753, Cl. 409-234.000.
Tack, Rufin; and Eggermont, Marc, to N.V. Bekaert S.A. Spool. 4,715,556, Cl. 242-118.600.
Tagushi, Masaaki: *See—*
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Taig, Alistair G., to Allied Corporation. Electric power assistance steering system. 4,715,462, Cl. 180-79.100.
Takacs, Gyoergy J.: *See—*
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Takada, Yoshikazu: *See—*
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Takagi, Masashi: *See—*
Nishizawa, Kazutoshi; Takagi, Masashi; and Matsuoka, Akio, 4,715,792, Cl. 417-295.000.
Nishizawa, Kazutoshi; Takagi, Masashi; Matsuoka, Akio; and Nomura, Fuzio, 4,715,800, Cl. 418-69.000.
Takahashi, Kenji; Kuwahara, Heikichi; Yanagida, Takehiko; Nakayama, Wataru; Oizumi, Kiyoshi; and Sugimoto, Shigeo, to Hitachi, Ltd.; and Hitachi Cable, Ltd. Construction of a heat transfer wall of a heat transfer pipe. 4,715,436, Cl. 165-133.000.
Takahashi, Kenji: *See—*
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Takahashi, Masatoshi: *See—*
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Takahashi, Mitsuo, to Seikoh Giken Co., Ltd.; and Sumitomo Heavy Industries, Ltd. Metal mold for resin molding. 4,715,804, Cl. 425-141.000.
Takahashi, Norio, to Nifco Inc. Plate fastener. 4,715,095, Cl. 24-453.000.
Takahashi, Satomi; Inoue, Kenji; Yanagida, Yoshifumi; Ohashi, Takehisa; and Watanabe, Kiyoshi, to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha. Process for preparing N-[1(S)-ethoxycarbonyl-3-phenylpropyl]-L-alanyl-L-proline. 4,716,235, Cl. 548-533.000.
Takahashi, Shinji; and Mita, Yoshinori, to Honda Giken Kogyo Kabushiki Kaisha. Body construction for motor scooter vehicles. 4,715,465, Cl. 180-225.000.
Takahashi, Susumu; and Iida, Hiroshi, to Sansui Electric Co., Ltd. AM stereo transmission method and apparatus. 4,716,590, Cl. 381-15.000.
Takahashi, Takao: *See—*
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Takahira, Yoshiyuki: *See—*
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Takai, Hideo: *See—*
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Takamura, Yoshio; and Nakajima, Akira, to Kabushiki Kaisha Toshiba. Multiple step-up rectifier circuit. 4,716,512, Cl. 363-61.000.
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Takase, Hiroshi; Imaizumi, Masaki; and Fujii, Toru, to Olympus Optical Co., Ltd. Vari-focal photographic lens system of rear lens group exchange type. 4,715,693, Cl. 350-422.000.
Takase, Sadao: *See—*
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Takeda, Hitoshi; and Takase, Sadao, to Nissan Motor Co., Ltd. Lock-up control for shockless gear shifting. 4,715,145, Cl. 74-731.000.
Takeda, Kazuhiro: *See—*
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Takeda, Nobuhiko: *See—*
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Takei, Akira: *See—*
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Takekoshi, Tohru; and Anderson, Patricia P., to General Electric Company. Crystalline polyimides containing cumulative phenylene sulfide units. 4,716,216, Cl. 528-352.000.
Takemae, Yoshihiro: *See—*
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Takeuchi, Masatoshi; and Hamagaki, Takayasu, to Seiken Co., Ltd. Nonwoven fiber abrasive disk. 4,715,150, Cl. 51-395.000.
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Taleyarkhan, Rusi P., to Westinghouse Electric Corp. BWR fuel assembly bottom nozzle with one-way coolant flow valve. 4,716,011, Cl. 376-281.000.
Tallon, James A.; and Lewis, Richard T., to Union Carbide Corporation. Esters as pitch plasticizers. 4,715,897, Cl. 106-284.000.
Talpo, Gianpietro: *See—*
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Tamaki, Kentaro: *See—*
Yamauchi, Takayoshi; Hattori, Kaneaki; Ikeda, Shunichi; and Tamaki, Kentaro, 4,716,241, Cl. 558-44.000.

Tamminen, Pentti, to LTH Associates. Process and apparatus for separating metals from solutions. 4,715,934, Cl. 204-10.000.

Tamura, Masao: *See—*
Shukuri, Shoji; Tamura, Masao; Wada, Yasuo; and Fujisaki, Yoshihisa, 4,716,127, Cl. 437-27.000.

Tanaka, Hiroshi; Iwata, Hiromitsu; and Kakizaki, Yukio, to Nippon Kogaku K. K. Apparatus for conveying and inspecting a substrate. 4,716,299, Cl. 250-571.000.

Tanaka, Hiroyoshi; Adachi, Masaaki; Tsuda, Yoshiyuki; Ando, Toshiaki; Nishiwaki, Humitoshi; and Aoyama, Shigeo, to Matsushita Electric Industrial Co. Ltd. Heat exchanger. 4,715,437, Cl. 165-151.000.

Tanaka, Kazuhiko, to Nippon Thompson Co., Ltd. Roller bearing for infinite rectilinear motion. 4,715,729, Cl. 384-44.000.

Tanaka, Masayuki: *See—*
Mashimo, Satoshi; Fujita, Kunihiro; Tanaka, Masayuki; Yamaguchi, Yoshio; and Takeda, Kazuhiro, 4,715,176, Cl. 57-251.000.

Tanaka, Sigeto: *See—*
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Tanaka, Tsunefumi, to Canon Kabushiki Kaisha. Photographic optical system having enhanced spectral transmittance characteristics. 4,716,284, Cl. 250-201.000.

Tanaka, Wataru: *See—*
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Taneya, Mototaka; Matsui, Sadayoshi; and Matsumoto, Mitsuhiro, to Sharp Kabushiki Kaisha. Method for the production of semiconductor devices. 4,716,129, Cl. 437-96.000.

Taniguchi, Masao: *See—*
Parsons, William H.; Schoen, William R.; Patchett, Arthur A.; and Taniguchi, Masao, 4,715,994, Cl. 260-502.50E.

Taniguchi, Nobuyuki; Ishida, Tokuji; Hamada, Masataka; Karasaki, Toshihiko; and Norita, Toshio, to Minolta Camera Kabushiki Kaisha. Focus condition detecting device. 4,716,434, Cl. 354-408.000.

Tanikawa, Shinji, to Yoshida Kogyo K. K. Watertight windowsill construction. 4,715,152, Cl. 52-209.000.

Tanizawa, Tetsu; and Ohba, Osam, to Fujitsu Limited. Logical biMOS gate circuit having low power dissipation. 4,716,310, Cl. 307-446.000.

Tanner, Robert A., to Dixon International Limited. Ventilator device. 4,715,268, Cl. 98-41.100.

Tashiro, Kiyoshi: *See—*
Miida, Takashi; Takei, Akira; and Tashiro, Kiyoshi, 4,716,466, Cl. 358-213.260.

Tatsuzawa, Hisao, to Yamaya Sangyo Co., Ltd. Pressure reducing instrument for pressure gauges. 4,715,230, Cl. 73-706.000.

Taub, Alan I.; and Frischmann, Peter G., to General Electric Company. Isothermal hold method of hot working of amorphous alloys. 4,715,906, Cl. 148-120.000.

Taylor, Attalee S.: *See—*
Andrews, Howard W., Jr.; Pickles, Charles S.; and Taylor, Attalee S., 4,715,820, Cl. 439-59.000.

Taylor, Lawrence D., to Brandt, Inc. Electro-optical paper dispenser controller having a variable gain amplifier with digital input control means. 4,716,286, Cl. 250-214.00R.

Taylor, Richard Q.: *See—*
Moji, Yukimori; and Taylor, Richard Q., 4,716,067, Cl. 428-117.000.

Team Construction and Fabrication, Inc.: *See—*
Falgout, Thomas E., Sr.; and Schoeffler, William N., 4,715,453, Cl. 175-73.000.

Team Engineering and Manufacturing, Inc.: *See—*
Falgout, Thomas E., Sr.; and Schoeffler, William N., 4,715,253, Cl. 81-57.140.

Techno Instruments Investments 1983 Ltd.: *See—*
Holtzman, Abraham M.; and Relis, Joseph, 4,715,894, Cl. 106-1.220.

Teeple, Edward. Surgical shield. 4,715,366, Cl. 128-132.00D.

Tegtmeier, Uwe: *See—*
Misselhorn, Klaus; and Tegtmeier, Uwe, 4,715,932, Cl. 203-43.000.

Teijin Limited: *See—*
Matsui, Hideo; Fujie, Hiroshi; and Noma, Takashi, 4,716,215, Cl. 528-348.000.
Suzuki, Yoshiki; Ikura, Hiroshi; Yamashita, Gentaro; and Nagai, Tsuneji, 4,715,369, Cl. 128-156.000.

Teijin Petrochemical Industries, Ltd.: *See—*
Hirose, Isao, 4,716,245, Cl. 562-416.000.

Teijin Seiki Co., Ltd.: *See—*
Miyake, Yuzuru; Nohara, Isao; Sugioka, Takami; Onishi, Susumu; and Ueno, Toshiyuki, 4,715,548, Cl. 242-18.00R.

Tektronix, Inc.: *See—*
Hung, Angelo C. J.; and Wang, Francis C., 4,716,564, Cl. 371-27.000.
Payne, David G., 4,716,500, Cl. 361-398.000.
Shank, Gordon W.; and Eason, Earl P., 4,716,345, Cl. 315-392.000.

Telectronics N.V.: *See—*
Harris, Donald L., 4,715,380, Cl. 128-419.00P.

Telefonaktiebolaget L M Ericsson: *See—*
Axell, Claes E. S., 4,715,821, Cl. 439-59.000.

Telefonaktiebolaget LM Ericsson: *See—*
Bergstrom, Bo C.; and Herolf, Knut O. M., 4,716,573, Cl. 375-1.000.

Telephone Cables Limited: *See—*
Johnson, Oliver S.; and Powell, Robert J. W., 4,715,678, Cl. 350-96.230.

Teng, Chuan C.; Chapelle, Rene A.; Blacklaws, John E.; and McComsey, Lee E. Mechanical directional drilling jar with swivel means. 4,715,454, Cl. 175-299.000.

Terada, Katsuyuki: *See—*
Okamoto, Isao; Hiraishi, Motomi; Takai, Hideo; Kasai, Kenjiro; and Terada, Katsuyuki, 4,715,289, Cl. 105-199.200.

Terashima, Jun: *See—*
Tokura, Go; Arakawa, Kazuhiko; and Terashima, Jun, 4,716,259, Cl. 174-68.500.

Ter Beek, Albertus: *See—*
Ter Beek, Gerrit J.; and Ter Beek, Albertus, 4,715,724, Cl. 366-157.000.

Ter Beek, Gerrit J.; and Ter Beek, Albertus. Head attachment for a hydraulic synthetic-resin working machine for colored synthetic resin. 4,715,724, Cl. 366-157.000.

Ternansky, Robert J., to Eli Lilly and Company. 1-(vinyl phosphonate adduct) pyrazolidinones. 4,716,232, Cl. 548-112.000.

Teroson G.m.b.H.: *See—*
Duck, Edward W.; and Scheffler, Ingolf, 4,716,070, Cl. 428-192.000.

Terrell, Sanford V.: *See—*
Gabuzda, Paul G.; and Terrell, Sanford V., 4,715,438, Cl. 165-185.000.

Tetra Pak International AB: *See—*
Berlin, Bo; and Nedstedt, Gert, 4,715,791, Cl. 417-274.000.
Kjelgaard, Tom; Hallberg, Anders; and Jacobsson, Kenth, 4,715,528, Cl. 229-123.100.

Texaco Inc.: *See—*
Curtis, Walter B.; Davis, Gregory L.; and Klimowicz, Mark C., 4,715,310, Cl. 114-220.000.
Grigsby, Robert A., Jr., 4,716,193, Cl. 524-730.000.
Kapusciniski, Maria M.; Kaufman, Benjamin J.; and Liu, Christopher S., 4,715,975, Cl. 252-50.000.
Lewis, Paul H., 4,716,137, Cl. 502-74.000.

Texas Instruments Incorporated: *See—*
Bridges, Jeffrey M., 4,715,109, Cl. 437-200.000.
Charboneau, Thomas J.; and Kawate, Keith W., 4,716,492, Cl. 361-283.000.
D'Arrigo, Sebastiano; Imondi, Giuliano; and Vergara, Sossio, 4,716,322, Cl. 307-592.000.
Ezura, Toyokazu; Katsumata, Fujio; and Ikeya, Kiyokazu, 4,715,823, Cl. 439-267.000.
McAdams, Hugh P., 4,716,320, Cl. 307-530.000.
Oxley, Donald W.; Bartley, David H.; and McEntee, Timothy J., 4,716,524, Cl. 364-200.000.

Tezuda, Tomofumi: *See—*
Umemura, Hiroyuki; Matsuda, Kenji; Tezuda, Tomofumi; Isono, Kazuaki; Ishioka, Hidenori; Sugawara, Sakuo; and Hara, Masanori, 4,715,191, Cl. 62-208.000.

Tezuka, Nobuo, to Canon Kabushiki Kaisha. Recording and/or reproducing apparatus having an imposed head shifting feature. 4,716,481, Cl. 360-106.000.

Tezuka, Sigeru; Yamamoto, Shoichi; and Yamamoto, Masayoshi, to Fuji Photo Film Co., Ltd. Electrophoresis apparatus. 4,715,942, Cl. 204-299.00R.

Th. Goldschmidt AG: *See—*
Gruning, Burghard; Holtschmidt, Ulrich; Koerner, Goetz; and Rossmy, Gerd, 4,715,986, Cl. 252-315.200.

Thaulez, Francis R., to Westinghouse Electric Corp. Dropped rod protection insensitive to large load loss. 4,716,009, Cl. 376-242.000.

Theeuwes, Felix: *See—*
Eckenhoff, James B.; Theeuwes, Felix; and Deters, Joseph C., 4,716,031, Cl. 424-453.000.

Theiss, Edmund: *See—*
Ehrler, Ernst; Eichlseder, Martin; and Theiss, Edmund, 4,715,806, Cl. 425-553.000.

Theiss, Scott M.: *See—*
Muller, Gary R.; Theiss, Scott M.; Brown, James E., Jr.; and Lawson, Bobby R., 4,715,324, Cl. 122-381.000.

Thermababy, S.A.: *See—*
Cappe, Alain; and Nabet, Claude, 4,716,278, Cl. 219-521.000.

Thermo King Corporation: *See—*
Waldschmidt, William L., 4,716,275, Cl. 219-201.000.

Thesing, Rich: *See—*
Nichols, Walt; Newsome, Reggie; Thesing, Rich; and Houck, Willie, 4,715,390, Cl. 131-335.000.

Thomas, Ronald L.; Titus, Terry C.; and Brandon, Craig A., to Clemson University. Process for obtaining juices from fruits containing same. 4,716,044, Cl. 426-51.000.

Thompson, Gary J. Manifold form assembly. 4,715,620, Cl. 282-9.00R.

Thompson, Gregory A.; and Davies, Huw M., to Calgene, Inc. Rapid enzyme assay by product selective blot. 4,716,101, Cl. 435-4.000.

Thompson, John A., to Exxon Research and Engineering Company. Method for the modification of polycarbonate membranes, the membranes produced by such method and their use. 4,715,960, Cl. 210-651.000.

Thompson, John R.; Hunting, Curtis J.; Masson, Ronald K.; and Trivelpiece, Craig E., to Payview Limited. Addressable subscription television system having multiple scrambling modes. 4,716,588, Cl. 380-20.000.

Thompson, Larry L., to Rock Dock, Inc. Concrete marine float and method of fabricating same. 4,715,307, Cl. 114-65.00A.
Thompson, Raymond M., Jr.: *See*—
Shapiro, Ronald L.; and Thompson, Raymond M., Jr., 4,715,818, Cl. 434-118.000.
Thomson-CGR: *See*—
Tirelli, Marco; Lecolant, Rene ; and Hecquet, Raoul, 4,715,917, Cl. 156-250.000.
Thomson Components-Mostek Corporation: *See*—
Proebsting, Robert J., 4,716,380, Cl. 330-253.000.
Thomson CSF: *See*—
Ambos, Rene ; Quagliaro, Gilles; and Fertil, Alain, 4,716,362, Cl. 324-77.00B.
Berger, Jean L., 4,716,580, Cl. 377-62.000.
Thorogood, Douglas E., to Baxter Travenol Laboratories, Inc. Method and apparatus for removal of items from a sterile enclosure. 4,715,165, Cl. 53-469.000.
Thorpe, John E.; and Sarang, Gursharan S., to M&T Chemicals Inc. Production of dielectric boards. 4,715,116, Cl. 29-846.000.
Thring, Robert H., to Southwest Research Institute. Multicylinder catalytic engine. 4,715,326, Cl. 123-3.000.
Thukral, Prem S.: *See*—
Bollands, Martin A.; Pike, William C.; Thukral, Prem S.; and Woolmington, Timothy P., 4,715,455, Cl. 175-402.000.
Thuries, Edmond; Masson, Jean-Paul; and Malik, Louis, to Alsthom-Atlantique. Connector for a telescopic isolating switch. 4,715,834, Cl. 439-842.000.
Tibbals, Edward C., Jr. Speed change device. 4,715,249, Cl. 74-800.000.
Tidman, Derek A.: *See*—
Goldstein, Yeshayahu S. A.; Tidman, Derek A.; Burton, Rodney L.; Massey, Dennis W.; and Winsor, Niels K., 4,715,261, Cl. 89-8.000.
Tillotson, John G. Method for forming a layer of blown cellular urethane on a carpet backing. 4,715,912, Cl. 156-79.000.
Tilly, Peter E., to Rockwell International Corporation. Adaptive analog variable limiter. 4,716,374, Cl. 328-169.000.
Timar, Tibor; Zsupan, Kalman; Repasi, Janos; Borsos nee Safranek, Iren; Kiss, Istvan; Fodor, Amdras; and Maroy, Peter, to Alkaloida Vegyeszeti Gyar. Chromene derivatives useful as insecticides. 4,716,238, Cl. 549-408.000.
Timberline Software Corporation: *See*—
Peltz, Curtis L.; Martin, George F.; and Blake, Peter H., 4,716,542, Cl. 364-900.000.
Tingey, Rosa F.: *See*—
Hurley, John L.; Puzo, Joseph D.; and Tingey, Rosa F., 4,716,074, Cl. 428-220.000.
Tirelli, Marco; Lecolant, Rene ; and Hecquet, Raoul, to Thomson-CGR. Process for the production of a multidetector with ionization chambers. 4,715,917, Cl. 156-250.000.
Tishura, Vladimir I.: *See*—
Lebedev, Vladimir K.; Chernenko, Ivan A.; Dyshlenko, Alexandr T.; Litvin, Leonid V.; and Tishura, Vladimir I., 4,715,523, Cl. 228-2.000.
Titmas, Richard C.: *See*—
Baker, Terence S.; Powell, Michael J.; and Titmas, Richard C., 4,716,109, Cl. 435-7.000.
Tittizer, Gabriel, to Interatom GmbH. Gas bearing. 4,715,731, Cl. 384-100.000.
Titus, Terry C.: *See*—
Thomas, Ronald L.; Titus, Terry C.; and Brandon, Craig A., 4,716,044, Cl. 426-51.000.
Tjoeng, Foe S.; Fok, Kam F.; and Adams, Steven P., to Monsanto Company. Synthetic airial peptides. 4,716,147, Cl. 514-11.000.
TLV Co., Ltd.: *See*—
Hasegawa, Yoshihiko; and Miyata, Osamu, 4,715,225, Cl. 73-215.000.
Toa Nenryo Kogyo Kabushiki Kaisha: *See*—
Fujita, Masahito; Kizaki, Masami; Miyazaki, Makoto; and Inaba, Naomi, 4,716,206, Cl. 526-139.000.
Tobias, Lee A.: *See*—
Hendry, James D.; and Tobias, Lee A., 4,715,284, Cl. 102-434.000.
Tocco, Inc.: *See*—
Pfaffmann, George D., 4,715,907, Cl. 148-144.000.
Todd, Mike J.; and Palmer, Gary E., to Hako Minuteman, Inc. High speed floor burnisher. 4,715,087, Cl. 15-385.000.
Todt, Klaus H.: *See*—
Biernoth, Gerhard; Menz, Hans-Udo; Todt, Klaus H.; and Wieske, Theophil, 4,716,047, Cl. 426-603.000.
Toisawa, Osamu: *See*—
Hirakouchi, Yoshie; Toisawa, Osamu; and Takahashi, Masatoshi, 4,715,991, Cl. 252-555.000.
Toja, Emilio, to Gruppo Lepetit, S.p.A. Pyridazino[4,3-c]-isoquinolines having anti-anxiety activity. 4,716,159, Cl. 514-210.000.
Tokita, Kiyoshi; and Kondou, Masayoshi, to Kabushiki Kaisha Toshiba. Shadow mask for a color cathode ray tube. 4,716,333, Cl. 313-402.000.
Tokiwa Kogyo Co., Ltd.: *See*—
Kameda, Hiroshi, 4,715,166, Cl. 53-550.000.
Tokoro, Setsuo: *See*—
Shigematsu, Takashi; Watanabe, Tomoyuki; Tokoro, Setsuo; and Sawada, Daisaku, 4,715,258, Cl. 74-866.000.
Watanabe, Tomoyuki; Shigematsu, Takashi; Tokoro, Setsuo; and Hayashi, Takashi, 4,715,482, Cl. 192-0.032.
Tokura, Go; Arakawa, Kazuhiko; and Terashima, Jun, to Canon Kabushiki Kaisha. Both-side flexible printed circuit board. 4,716,259, Cl. 174-68.500.
Tokuyama Soda Kabushiki Kaisha: *See*—
Sata, Toshikatsu; Katsube, Teruaki; and Iida, Yoshiya, 4,715,691, Cl. 350-357.000.
Tokya Shibaura Denki Kabushiki Kaisha: *See*—
Hosaka, Yasuo, 4,716,456, Cl. 358-75.000.
Tokyo Kikai Seisakusho, Ltd.: *See*—
Hayashi, Mamoru; and Kawamori, Hideo, 4,715,922, Cl. 156-361.000.
Tokyo Shibaura Denki Kabushiki Kaisha: *See*—
Hirai, Shoichi; and Watanabe, Sedakazu, 4,716,593, Cl. 381-42.000.
Katayama, Yoshitaka; Nabeshima, Daiki; and Nakamura, Shinichi, 4,716,558, Cl. 369-33.000.
Matsuo, Kenji; Sasaki, Itsuo; Suzuki, Hiroaki; and Kunieda, Mitsuyuki, 4,716,308, Cl. 307-303.000.
Tom, Glenn M., to Hercules Incorporated. Scavengers for the removal of impurities from arsine and phosphine. 4,716,181, Cl. 521-53.000.
Tome, Richard E.: *See*—
Gasparro, Michael R.; and Tome, Richard E., 4,716,012, Cl. 376-352.000.
Tometsko, Andrew M.: *See*—
Chanda, Subir; Riedhammer, Thomas M.; and Tometsko, Andrew M., 4,715,899, Cl. 134-26.000.
Tomisawa, Naoki, to Japan Electronic Control Systems, Co., Ltd. Learning and control apparatus for electronically controlled internal combustion engine. 4,715,344, Cl. 123-489.000.
Tomita, Kuniyuki; Shimoji, Yasuo; Kumakura, Seiji; Koike, Hiroyuki; Iwata, Nobuyoshi; and Morisawa, Yasuhiro, to Sankyo Company, Limited. Fused 5 ring heterocyclic compounds, their preparation, and their anti-arrhythmic and diuretic use. 4,716,162, Cl. 514-234.000.
Tomm, Dagwin: *See*—
Rostin, Gunther; Tomm, Dagwin; and Hartig, Franz, 4,715,485, Cl. 192-106.200.
Tommis, Norman; and Cooper, James A., to AE PLC. Reinforcement of articles of cast metal or metal alloy. 4,715,422, Cl. 164-97.000.
Tompkins, E. Neil; and Bartholmae, Jack N., to Datapoint Corporation. Gain switched audio conferencing network. 4,716,585, Cl. 379-202.000.
Toncelli, Marcello. Process for the preparation of putty for use in coating, including automatic coating of slabs of marble or stone and the like under vacuo in two separate containers. 4,716,057, Cl. 427-393.600.
Toppan Printing Co., Ltd.: *See*—
Tsuzuki, Kiyoshi; Tanaka, Sigeto; and Take, Yoshiaki, 4,715,527, Cl. 229-1.50B.
Torigoe, Toshihiro: *See*—
Sakamoto, Hiroshi; Torigoe, Toshihiro; and Yamaguchi, Tadashi, 4,716,291, Cl. 250-318.000.
Torii, Munetomo: *See*—
Kagawa, Hirohiko; Kyotani, Yasuhiro; and Torii, Munetomo, 4,716,184, Cl. 523-310.000.
Tosaka, Yoichi: *See*—
Kawamura, Masaharu; Harada, Yoshihito; Kobayashi, Ryuichi; Suzuki, Masayuki; Ohara, Tsunemasa; and Tosaka, Yoichi, 4,716,428, Cl. 354-173.110.
Toshiba Kikai Kabushiki Kaisha: *See*—
Date, Takao; Okumura, Masaru; and Watanabe, Koya, 4,715,490, Cl. 198-346.100.
Sugiyama, Kiyoshi; and Nakamura, Kotaro, 4,715,108, Cl. 29-568.000.
Tosill, John M.: *See*—
Potter, Charles; Bell, Ronald F.; and Tosill, John M., 4,715,517, Cl. 222-181.000.
Toti, Daniela: *See*—
Scarponi, Ugo; Lazzarini, Anna M.; Toti, Daniela; and de Castiglione, Roberto, 4,716,228, Cl. 540-578.000.
Toulouse, Charles P., to Lake Center Industries. Vacuum switch. 4,716,264, Cl. 200-61.860.
Tour & Andersson AB: *See*—
Hammarstedt, Curt, 4,715,579, Cl. 251-121.000.
Toutant, Roy T.: *See*—
Parker, Preston K.; and Toutant, Roy T., 4,715,286, Cl. 104-88.000.
Townsend, Paul: *See*—
O'Connor, Stuart; Bell, Donald; Fox, Trevor R.; and Townsend, Paul, 4,716,408, Cl. 340-825.500.
Toyo Jozo Company, Ltd.: *See*—
Morishita, Masataka; Ono, Masaru; and Sumita, Yukio, 4,716,153, Cl. 514-30.000.
Toyo Rubber Industry Co., Ltd.: *See*—
Miyoshi, Shoji; and Nomura, Ryuichi, 4,715,418, Cl. 152-451.000.
Toyo Seimaiki Seisakusho K. K.: *See*—
Saika, Nobuo, 4,715,487, Cl. 193-2.00R.
Toyo Soda Manufacturing Co., Ltd.: *See*—
Kasai, Kiyoshi; Tsukidate, Takaaki; and Arakawa, Toshihiko, 4,716,028, Cl. 423-344.000.
Toyoda Koki Kabushiki Kaisha: *See*—
Nakamura, Keiichi; and Suzuki, Mikio, 4,715,464, Cl. 180-142.000.
Toyota Jidosha Kabushiki Kaisha: *See*—
Asami, Ken; Ohashi, Kaoru; Onuma, Toshio; and Buma, Shuuichi, 4,715,616, Cl. 280-707.000.
Ito, Takaaki; Mori, Eiji; Uranishi, Koji; Miyazaki, Shinji; and Sugimoto, Junichi, 4,715,509, Cl. 220-86.00R.
Katsumoto, Naoaki; and Miyagawa, Toshihito, 4,715,655, Cl. 297-362.000.
Kinoshita, Yoshiaki, 4,715,343, Cl. 123-489.000.
Nakanishi, Nobuyasu; Ishikawa, Masakazu; Shirai, Akira; and Noguchi, Noboru, 4,715,664, Cl. 303-111.000.

Oosawa, Kouichi; and Kinoshita, Yoshiaki, 4,715,184, Cl. 60-602.000.
Otsuki, Hiromi; Numata, Kenichi; Matsuura, Ryoichi; Nomura, Yoshihisa; Nakanishi, Nobuyasu; and Oka, Hiroyuki, 4,715,667, Cl. 303-119.000.
Shigematsu, Takashi; Watanabe, Tomoyuki; Tokoro, Setsuo; and Sawada, Daisaku, 4,715,258, Cl. 74-866.000.
Watanabe, Tomoyuki; Shigematsu, Takashi; Tokoro, Setsuo; and Hayashi, Takashi, 4,715,482, Cl. 192-0.032.
Tran, Loi H., to Controlled Release Technologies, Inc. Therapeutic agent delivery system and method. 4,715,850, Cl. 604-82.000.
Transpec Inc.: *See*—
Manning, Donald L., 4,715,630, Cl. 293-120.000.
Traub AG: *See*—
Wiesner, Franz; and Etzel, Horst, 4,715,636, Cl. 294-86.400.
Travlos, Constantine M., to United States of America, Air Force. Wire carrier and loading apparatus. 4,715,549, Cl. 242-25.00R.
Treu, Dennis M.: *See*—
Shouldice, David R.; and Treu, Dennis M., 4,715,398, Cl. 137-171.000.
Trico Products Corporation: *See*—
Gowans, Neil A.; and Riester, William C., 4,715,082, Cl. 15-250.420.
Trinity Industries, Inc.: *See*—
Hart, James D., 4,715,291, Cl. 105-378.000.
TriQuint: *See*—
Davenport, William H.; McCormack, Gary D.; and LaRue, George S., 4,716,311, Cl. 307-448.000.
Trivelpiece, Craig E.: *See*—
Thompson, John R.; Hunting, Curtis J.; Masson, Ronald K.; and Trivelpiece, Craig E., 4,716,588, Cl. 380-20.000.
Tromp, Wouter T.: *See*—
Neven, Jozef H. M.; Poortman, Boodewijn J.; Tromp, Wouter T.; and Stevens, Udo, 4,715,233, Cl. 73-871.120.
Truett, Martha: *See*—
Kuo, George; Masiarz, Frank R.; Truett, Martha; Valenzuela, Pablo; Rasmussen, Mirella E.; and Favaloro, Jennifer, 4,716,117, Cl. 435-240.270.
Trummelmeyer, Gerhard; and Ruprecht, Hans-Dieter, to Bayer Aktiengesellschaft. Use of liquid, cold-hardening polyurethane-urea-forming components for corrosion-inhibiting, wear-resistant coatings on metal and plastics surfaces and moldings and on stone and concrete. 4,716,210, Cl. 528-75.000.
Trus Joist Corporation: *See*—
Brightwell, Lionel L., 4,715,162, Cl. 52-729.000.
Trutek Research, Inc.: *See*—
Nowacki, Christopher; and Brisson, Alfred G., 4,715,375, Cl. 128-328.000.
Nowacki, Christopher; and Brisson, Alfred G., 4,715,376, Cl. 128-328.000.
Truth Incorporated: *See*—
Schema, Anthony C., 4,715,089, Cl. 16-115.000.
TRW Inc.: *See*—
Danico, Henry F.; and Hammerle, Frederick A., 4,715,756, Cl. 411-369.000.
Elliott, Jeffrey H.; Stokes, Robert B.; Penunuri, David; and Yen, Kuo-Hsiung, 4,716,390, Cl. 333-202.000.
Tsay, Yuh-Geng; Beigler, Myron A.; Calenoff, Emanuel; Friesen, Gerald L.; and Nichols, James L., to Minnesota Mining and Manufacturing Company. Stable allergenic extracts and methods. 4,716,120, Cl. 436-513.000.
Tschudin-Mahrer, Rolf, to Irbit Research & Consulting AG. Foam acoustic absorption member. 4,715,473, Cl. 181-286.000.
Tsuboi, Shigeru: *See*—
Yano, Naomichi; Ueno, Tadatsugu; and Tsuboi, Shigeru, 4,715,978, Cl. 252-70.000.
Tsuda, Yoshiyuki: *See*—
Tanaka, Hiroyoshi; Adachi, Masaaki; Tsuda, Yoshiyuki; Ando, Toshiaki; Nishiwaki, Humitoshi; and Aoyama, Shigeo, 4,715,437, Cl. 165-151.000.
Tsuhara, Susumu: *See*—
Tabata, Kuniaki; and Tsuhara, Susumu, 4,716,404, Cl. 340-723.000.
Tsuji, Masanori: *See*—
Ito, Yasuro; Higuchi, Yoshiro; Shiki, Takeshi; Tsuji, Yukikazu; Tsuji, Masanori; and Hayakawa, Mitsutaka, 4,715,719, Cl. 366-2.000.
Tsuji, Yukikazu: *See*—
Ito, Yasuro; Higuchi, Yoshiro; Shiki, Takeshi; Tsuji, Yukikazu; Tsuji, Masanori; and Hayakawa, Mitsutaka, 4,715,719, Cl. 366-2.000.
Tsukasaki, Hidaka: *See*—
Kobayashi, Kiyotaka; Tsukasaki, Hidaka; and Baba, Takaaki, 4,715,348, Cl. 123-571.000.
Tsukidate, Takaaki: *See*—
Kasai, Kiyoshi; Tsukidate, Takaaki; and Arakawa, Toshihiko, 4,716,028, Cl. 423-344.000.
Tsukuda, Yasuo; Hara, Hisao; Harada, Hideki; and Iizuka, Yasuo, to Hitachi Metals, Ltd. Exhaust port assembly. 4,715,178, Cl. 60-272.000.
Tsuruta, Kenji, to Ohbayashi-Gumi, Ltd. Method of measuring the strength of concrete for slip form process. 4,715,726, Cl. 374-102.000.
Tsutsui, Kyoji, to Ricoh Co., Ltd. Disazo compounds with xanthone nucleus for electrophotography. 4,716,220, Cl. 534-738.000.
Tsuzuki, Kiyoshi; Tanaka, Sigeto; and Take, Yoshiaki, to Toppan Printing Co., Ltd. Ultrasonically sealed side seam on cup. 4,715,527, Cl. 229-1.50B.
Tucker, James L., Jr.: *See*—
Ostendorff, Eric C.; and Tucker, James L., Jr., 4,715,843, Cl. 446-429.000.
Tuckey, Charles H., to Walbro Corporation. Lateral channel supply pump. 4,715,777, Cl. 415-53.00T.
Tuenker, Gerhard: *See*—
Dislich, Helmut; Arfsten, Nanning J.; Schmidt, Helmut; Philipp, Gottfried; and Tuenker, Gerhard, 4,715,999, Cl. 264-1.100.
Tuman, Robert W.: *See*—
Epps, Joyce E.; Ng, Kung-Tat; Tuman, Robert W.; and Wu, Wu-Nan, 4,716,163, Cl. 514-237.000.
Turukhano, Boris G. Apparatus for copying holographic diffraction gratings. 4,715,670, Cl. 350-3.690.
Tveter, Richard S.; and Miller, Wayne A., to S. Himmelstein and Company. Leak tester. 4,715,214, Cl. 73-49.200.
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Mori, Shoichiro; and Ue, Makoto, 4,715,976, Cl. 252-62.200.
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Ueda, Yoshihiro; Ono, Kouichi; Oomori, Tatsuo; and Fujita, Shigeto, to Mitsubishi Denki Kabushiki Kaisha. Ion beam generator. 4,716,295, Cl. 250-423.00P.
Uehara, Haruo; and Omata, Hiroshi, to Canon Kabushiki Kaisha. Information recording disk. 4,716,063, Cl. 428-65.000.
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Yano, Naomichi; Ueno, Tadatsugu; and Tsuboi, Shigeru, 4,715,978, Cl. 252-70.000.
Ueno, Toshiyuki: *See*—
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Ueno, Yoshio: *See*—
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Uera, Yoshinori: *See*—
Hatakeyama, Tetsuo; Uera, Yoshinori; and Nagao, Nobuaki, 4,715,553, Cl. 242-68.400.
Uesugi, Mitsuaki: *See*—
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Umemura, Hiroyuki; Matsuda, Kenji; Tezuda, Tomofumi; Isono, Kazuaki; Ishioka, Hidenori; Sugawara, Sakuo; and Hara, Masanori, to Mitsubishi Denki Kabushiki Kaisha. Air conditioning method. 4,715,191, Cl. 62-208.000.
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Backlund, Ulf E. H. H.; and Ungerstedt, Carl U., 4,715,413, Cl. 141-94.000.
Union Carbide Corporation: *See*—
Abatjoglou, Anthony G.; and Bryant, David R., 4,716,250, Cl. 568-454.000.
Murray, Rex E., 4,716,138, Cl. 502-117.000.
Salensky, George A., 4,715,977, Cl. 252-62.540.
Tallon, James A.; and Lewis, Richard T., 4,715,897, Cl. 106-284.000.
Union Oil Company of California: *See*—
Biale, John, 4,716,085, Cl. 428-476.900.
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Gabuzda, Paul G.; and Terrell, Sanford V., 4,715,438, Cl. 165-185.000.
United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the: *See*—
Luttrell, Stephen P.; and Oliver, Christopher J., 4,716,414, Cl. 342-179.000.
United States of America
Agriculture: *See*—
Andersen, Robert N.; and Walker, Harrell L., 4,715,881, Cl. 71-79.000.
Air Force: *See*—
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Travlos, Constantine M., 4,715,549, Cl. 242-25.00R.
America: *See*—
Morrison, Garrett L., 4,716,027, Cl. 423-225.000.
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Ames, Alan J., 4,716,507, Cl. 362-311.000.
Eitel, Frederick G., 4,715,694, Cl. 350-486.000.
Gregory, Don A.; and Guenther, Bob D., 4,715,683, Cl. 350-331.00R.
Mongeon, Robert J.; Wayne, Robert J.; and Henschke, Robert W., 4,716,444, Cl. 356-05.000.
Quamen, Ronny A., 4,715,563, Cl. 244-152.000.
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U.S. Philips Corporation: *See*—
Bringmann, Udo; Drews, Klaus; and Schon, Detlef, 4,715,319, Cl. 118-723.000.
Esser, Leonard J. M.; Van de Wiel, Petrus J. A. M.; Daverveld, Leonardus A.; and Van Gils, Johannes A. A., 4,716,446, Cl. 357-23.140.
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Joosten, Henricus C. M., 4,715,119, Cl. 29-858.000.
Mulder, Cornelis; and Wulms, Henricus E. J., 4,716,314, Cl. 307-477.000.
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Schutten, Evert D.; and Verlijsdonk, Johannus G., 4,716,335, Cl. 313-486.000.
Schutten, Evert D.; and Verlijsdonk, Johannus G., 4,716,336, Cl. 313-486.000.
Spierings, Alphons F. E. B., 4,716,317, Cl. 307-520.000.
Stroppiana, Robert J., 4,716,309, Cl. 307-442.000.
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United States Surgical Corporation: *See*—
Roehr, William H., Jr.; and Goodman, Richard L., 4,715,520, Cl. 227-19.000.

United Technologies Corporation: *See*—
Anderson, Roy W.; Ross, Stephen J.; and Henderson, Larry D., 4,715,723, Cl. 366-142.000.
Blackburn, Martin J.; and Smith, Michael P., 4,716,020, Cl. 420-418.000.
Mainelli, Roy J.; and Preston, Donald, 4,715,395, Cl. 138-42.000.
Stearns, Charles F., 4,715,397, Cl. 137-84.000.
Suciu, Gabriel L., 4,715,779, Cl. 415-144.000.

Unitrode Corporation: *See*—
Patel, Raoji, 4,716,514, Cl. 363-127.000.

Univ. of California, The Regents of the: *See*—
Rose, Jed E., 4,715,387, Cl. 131-270.000.

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Stone, Thomas W., 4,716,327, Cl. 310-90.000.

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Lindquist, John, 4,716,343, Cl. 315-307.000.

University of California, The Regents of the: *See*—
Amstutz, Harlan C.; and Kabo, J. Michael, 4,715,860, Cl. 623-22.000.
Levy, Jay A., 4,716,102, Cl. 435-5.000.

University of Delaware: *See*—
Fakirov, Stoyko C.; and Schultz, Jerold M., 4,715,919, Cl. 156-307.300.

University Patents, Inc.: *See*—
Caruthers, Marvin H.; Leineweber, Michael; Leitner, Moshe; and Stabinsky, Yitzhak, 4,716,217, Cl. 530-351.000.

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UOP Inc.: *See*—
Imai, Tamotsu, 4,716,143, Cl. 502-326.000.
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Ura, Syouzabu: *See*—
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Uratani, Eiichi. Dehumidifier for a compressed gas. 4,715,871, Cl. 55-222.000.

Urban, Frank J., to Pfizer Inc. Process for the production of an (S)-methyl or (S)-ethyl 4-amino-6-fluorochroman-4-carboxylate. 4,716,113, Cl. 435-125.000.

Urban, Milfred W. Mirror and bracket assembly. 4,715,701, Cl. 350-625.000.

Usui, Yuichi: *See*—
Osaka, Keiji; Usui, Yuichi; and Yanagi, Tooru, 4,715,876, Cl. 65-4.210.

Utility Electronics Industries Co. Ltd.: *See*—
Hung, Michael, 4,715,787, Cl. 417-63.000.

Utne, Torleif: *See*—
Reinhold, Donald F.; Utne, Torleif; and Abramson, Newton L., 4,716,246, Cl. 562-446.000.

Vacuum Barrier Corporation: *See*—
Stearns, Thornton, 4,715,187, Cl. 62-55.000.

Vacuumschmelze GmbH: *See*—
Rudolph, Johann, 4,715,207, Cl. 72-268.000.

Vaillancourt, Vincent L. Multidose disposable syringe and method of filling same. 4,715,854, Cl. 604-191.000.

Valenzuela, Pablo: *See*—
Kuo, George; Masiarz, Frank R.; Truett, Martha; Valenzuela, Pablo; Rasmussen, Mirella E.; and Favaloro, Jennifer, 4,716,117, Cl. 435-240.270.

Valhi, Inc.: *See*—
Craig, Clark E., 4,715,201, Cl. 70-369.000.

Van Bogaert, Philippe; and Deconinck, Filip, to Picanol N.V. Speed control for weft feed spool in weaving looms. 4,715,411, Cl. 139-452.000.

Vandenberg, Andrew W.: *See*—
Vandenberg, August; Vandenberg, Ben W.; Vandenberg, Andrew W.; and Haws, Ben E., 4,715,321, Cl. 119-14.030.

Vandenberg, August; Vandenberg, Ben W.; Vandenberg, Andrew W.; and Haws, Ben E. Milking parlor stall construction with overhead gates. 4,715,321, Cl. 119-14.030.

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Vandenberg, August; Vandenberg, Ben W.; Vandenberg, Andrew W.; and Haws, Ben E., 4,715,321, Cl. 119-14.030.

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van der Meer, Roelof, to General Electric Company. Resin composition and articles formed therefrom. 4,716,199, Cl. 525-92.000.

van der Meulen, Leendert; and Van Der Wouden, Adriaan, to van der Meulen, Leendert. Set up piece for mounting on a can, containing a beverage. 4,715,510, Cl. 220-90.400.

Van Der Wouden, Adriaan: *See*—
van der Meulen, Leendert; and Van Der Wouden, Adriaan, 4,715,510, Cl. 220-90.400.

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Stanford, John L.; Cohen, Irun R.; Frenkel, Ayala; Holoshitz, Joseph; van Eden, Willem; and Rook, Graham A. W., 4,716,038, Cl. 424-92.000.

Van Eldik, Linda J.; and Watterson, D. Martin, to Vanderbilt University; and Rockefeller University, The. Synthetic peptides and use thereof in preparing calmodulin antisera. 4,716,150, Cl. 514-14.000.

Van Gils, Johannes A. A.: *See*—
Esser, Leonard J. M.; Van de Wiel, Petrus J. A. M.; Daverveld, Leonardus A.; and Van Gils, Johannes A. A., 4,716,446, Cl. 357-23.140.

VanHooser, Neal E. Bottom-hole pump fluid flow controller. 4,715,794, Cl. 417-313.000.

Vanier, Noel R.; Lum, Kin K.; and Bowman, Wayne A., to Eastman Kodak Company. Dye-barrier and subbing layer for dye-donor element used in thermal dye transfer. 4,716,144, Cl. 503-227.000.

Vanier, Noel R.; Byers, Gary W.; and Weber, Helmut, to Eastman Kodak Company. Non-imagewise reheating of transferred dyes in thermal dye transfer elements. 4,716,145, Cl. 503-227.000.

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Van Oosting, Barbara B., executrix: *See*—
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van Roermund, Arthur H. M., to U.S. Philips Corporation. Switched-capacitor multiplier circuit. 4,716,375, Cl. 329-50.000.

van Zanten, Anton; and Heess, Gerhard, to Robert Bosch GmbH. Method for determining an optimal slip value. 4,715,662, Cl. 303-109.000.

Varian Associates, Inc.: *See*—
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Hutchinson, Martin A., 4,715,764, Cl. 414-217.000.

Varley, Alan. Golf club with head weight control device. 4,715,606, Cl. 273-194.00B.

Vasiliev, Vsevolod V.: *See*—
Paton, Boris E.; Vasiliev, Vsevolod V.; Bogdanovsky, Valentin A.; Danilyak, Sergei N.; Gavva, Viktor M.; Roiko, Jury P.; and Nushko, Valery A., 4,716,273, Cl. 219-130.010.

Venkatesan, Srini: *See*—
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Vereinigte Aluminium-Werke Aktiengesellschaft: *See*—
Asten, Wolfgang V.; Dorner, Karl H.; Scheel, Hartmut; and Wurstle, Volker, 4,715,903, Cl. 148-11.50A.

Vergara, Sossio: *See*—
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Verhoeven, Laurentius M., to Du Pont de Nemours, E. I., and Company. Connector for interconnecting cable to a printed circuit board. 4,715,824, Cl. 439-391.000.

Verlijsdonk, Johannus G.: *See*—
Schutten, Evert D.; and Verlijsdonk, Johannus G., 4,716,335, Cl. 313-486.000.
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Veronesi, Luciano; and Garner, Daniel C., to Westinghouse Electric Corp. Nuclear reactor. 4,716,013, Cl. 376-353.000.

Verrelli, Loreto, to EBCO Industries Ltd. Disk operated plastic bag dispenser. 4,715,489, Cl. 194-256.000.

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Cozewith, Charles; Ju, Shiaw; and Verstrate, Gary W., 4,716,207, Cl. 526-169.200.

Victor Company of Japan, Ltd.: *See*—
Itonaga, Makoto, 4,716,560, Cl. 369-275.000.

Vidondo, Felix G., to Jofemar, S.A. Automatic unitary product dispensing device. 4,715,514, Cl. 221-258.000.

Viner, Loraine. Fabric repair implement and method of mending holes in fabrics. 4,715,914, Cl. 156-94.000.

Vitro Tec Fideicomiso: *See*—
Humberto-Calderon-Quintero, Miguel, 4,715,880, Cl. 65-260.000.

Vo, Toan P., to Calgon Carbon Corporation. Auxiliary bed pressure swing adsorption molecular sieve. 4,715,867, Cl. 55-26.000.

Voirol, Peter: *See*—
Ruegg, Christoph; Voirol, Peter; Fuchs, Willi; and Meister, Hans U., 4,715,739, Cl. 403-30.000.

Voisin, Jean-Paul: *See*—
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Volkswagen AG: *See*—
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von Matuschka, Alfred G.; Liethschmidt, Klaus; Webert, Hubertus; and Kohler, Emil K., to Elektroschmelzwerk Kempten GmbH. Kiln furniture. 4,715,812, Cl. 432-258.000.

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Vowles, E. John: *See*—
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Groner, Gabriel F.; Dorsey, Eric A.; Williams, Keith M.; and Vyas, Harihar J., 4,716,583, Cl. 379-88.000.

Vyhna, Richard F.: *See*—
Gnanamuthu, Daniel S.; Moores, Ralph J.; Paton, Neil E.; and Vyhna, Richard F., 4,716,270, Cl. 219-121.0LM.

Vyne, Robert L.; and Susak, David M., to Motorola, Inc. JFET pinch off voltage proportional reference current generating circuit. 4,716,356, Cl. 323-312.000.

W. Vinten Limited: *See*—
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Wachtler: *See*—
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Wacker, Hans, to Renz, Wacker & Co. Maschinenfabrik. Method and apparatus for producing bimetallic contacts, especially bimetallic welded contacts. 4,716,268, Cl. 219-118.000.

Wada, Hiroshi; and Kosaka, Yuzo, to Eiken Kagaku Kabushiki Kaisha. Composition for assaying hydrogen peroxide. 4,716,110, Cl. 435-25.000.

Wada, Masaru: *See*—
Hamada, Ken; Wada, Masaru; and Itoh, Kunio, 4,716,571, Cl. 372-48.000.

Wada, Tetsuro; and Ohkubo, Yasuo, to Kabushiki Kaisha Toshiba. Power voltage drop detecting circuit. 4,716,323, Cl. 307-594.000.

Wada, Yasuo: *See*—
Shukuri, Shoji; Tamura, Masao; Wada, Yasuo; and Fujisaki, Yoshihisa, 4,716,127, Cl. 437-27.000.

Wade, Mark W. Theft-proofing device for outboard motor propellers. 4,715,783, Cl. 416-146.00R.

Waeschle Maschinenfabrik GmbH: *See*—
Hoppe, Hans; Heep, Dieter; Eberhard, Norbert; and Miller, Werner, 4,715,749, Cl. 406-14.000.
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Wagener, Heinze-Jurgen: *See*—
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Wagner, Claus: *See*—
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Wagner, David P.: *See*—
Broomfield, Donald J.; Briggs, Paul C.; Parker, Eric G.; and Wagner, David P., 4,715,316, Cl. 118-716.000.

Wagner, Rudolf; Halcour, Kurt; Dicke, Hans-Rudolf; and Eckhardt, Volker, to Bayer Aktiengesellschaft. Process for the preparation of bis-hydroxyphenyl-n-alkanes, new bis-hydroxyphenyl-n-alkanes and new alkanediones. 4,716,252, Cl. 568-729.000.

Wagner, Steven D.: *See*—
Oldershaw, Reginald W.; and Wagner, Steven D., 4,716,454, Cl. 358-18.000.

Wakamatsu, Fumio, to Aisin Seiki Kabushiki Kaisha. Device for installing skin on automotive seat. 4,715,651, Cl. 297-219.000.

Walbro Corporation: *See*—
Tuckey, Charles H., 4,715,777, Cl. 415-53.00T.

Waldschmidt, William L., to Thermo King Corporation. Evaporator coil heat exchanger assembly. 4,716,275, Cl. 219-201.000.

Walk, Hansjorg; and Wagener, Heinze-Jurgen, to Keiper Recaro GmbH & Co. Hinge joint for the seats of motor vehicles and the like. 4,715,656, Cl. 297-362.000.

Walker, Claud W. Pollution control through fuel treatment. 4,715,325, Cl. 123-1.00A.

Walker, Donald R.: *See*—
Mitchell, Hal D.; and Walker, Donald R., 4,715,066, Cl. 2-2.000.

Walker, Harrell L.: *See*—
Andersen, Robert N.; and Walker, Harrell L., 4,715,881, Cl. 71-79.000.

Walker, James L.; and Foreman, Paul B., to National Starch and Chemical Corporation. Removable pressure sensitive adhesive. 4,716,194, Cl. 524-806.000.

Walker, Lonnie R.; Besryman, Leslie N.; Guffee, Larry E.; Ripley, David E.; and Prucha, David A., to Halliburton Company. Transportable integrated blending system. 4,715,721, Cl. 366-132.000.

Walker, Lonnie R.: *See*—
Denison, William J.; Smith, Lancing G.; and Walker, Lonnie R., 4,715,308, Cl. 114-72.000.

Wallace, David R.; Rothschild, George E.; and Hamilton, Robert W. Crib. 4,715,074, Cl. 5-93.00R.

Wallenfels, Kurt; and Fathy, Ahmed M., to Hoechst Aktiengesellschaft. Substrates for hydrolases. 4,716,222, Cl. 536-18.700.

Wallroth, Carl-Friedrich: *See*—
Altner, Ulrich; Falb, Wolfgang; Ryschka, Martin; and Wallroth, Carl-Friedrich, 4,715,370, Cl. 128-204.130.

Walsh, Edward; and Woito, David W., to Hewlett-Packard Company. Two point attachment with single point clamping for connecting the arm stack to the actuator member in a disc memory drive. 4,716,478, Cl. 360-104.000.

Walsh, Edward, to Hewlett-Packard Company. Head actuator limit stop assembly for a disk memory drive. 4,716,482, Cl. 360-106.000.

Walsh, Edward, to Hewlett-Packard Company. Three piece head actuator arm assembly for disc drive. 4,716,483, Cl. 360-106.000.

Wam-Plast AG: *See*—
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Wang, Charles P. Laser doppler displacement measuring system and apparatus. 4,715,706, Cl. 356-5.000.

Wang, Francis C.: *See*—
Hung, Angelo C. J.; and Wang, Francis C., 4,716,564, Cl. 371-27.000.

Wang Laboratories, Inc.: *See*—
Whipple, David L.; and Mann, Edward D., 4,716,545, Cl. 364-900.000.

Wang, Wei C.: *See*—
Pace, W. David; and Wang, Wei C., 4,716,510, Cl. 363-49.000.

Wankel GmbH: *See*—
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Ward, Frederick E.; and Yip, Kin F., to Miles Laboratories, Inc. Method for synthesizing esters. 4,716,236, Cl. 548-556.000.

Ward, James F. Portable stadium seat with tray. 4,715,652, Cl. 297-252.000.

Ward, Robert W.: *See*—
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Wargo, Robert A.; Harwood, Leopold A.; Pritchard, Dalton H.; and Chartier, Michael S., to RCA Corporation. Motion adaptive television signal processing system. 4,716,462, Cl. 358-166.000.

Warner-Lambert Company: *See*—
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Hoefle, Milton L.; Holmes, Ann; and Roth, Bruce D., 4,716,175, Cl. 514-357.000.

Warner & Swasey Company, The: *See*—
Wolf, Heinz K.; and Mukherjee, Jyoti, 4,715,102, Cl. 29-27.00R.

Warren, Janice M.: *See*—
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Wasa, Kiyotaka: *See*—
Kawaguchi, Takao; Adachi, Hideaki; Setsune, Kentaro; Ohji, Kenzo; and Wasa, Kiyotaka, 4,715,680, Cl. 350-96.340.

Wash World Industries Limited: *See*—
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Watanabe, Hamao: *See*—
Nagai, Yoichiro; Watanabe, Hamao; and Akutsu, Yoshinori, 4,716,240, Cl. 556-430.000.

Watanabe, Katsunori: *See*—
Yoshihara, Toshiyuki; Hiro, Masaaki; and Watanabe, Katsunori, 4,716,091, Cl. 430-66.000.

Watanabe, Kiyoshi: *See*—
Takahashi, Satomi; Inoue, Kenji; Yanagida, Yoshifumi; Ohashi, Takehisa; and Watanabe, Kiyoshi, 4,716,235, Cl. 548-533.000.

Watanabe, Koya: *See*—
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Farrell, Barbara L., 4,716,438, Cl. 355-6.000.
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Gion, Hidenori; Yoda, Takumi; Kirita, Yasuzo; Zaima, Kazuhito; and Kurata, Noriyuki, 4,715,849, Cl. 604-52.000.

Yokogawa Electric Corporation: *See*—
Inoue, Yuji; Iwaoka, Hideto; and Sugiyama, Tadashi, 4,716,370, Cl. 324-319.000.

Yokogawa Medical Systems, Limited: *See*—
Endo, Hisashi, 4,716,426, Cl. 354-76.000.
Inoue, Yuji; Iwaoka, Hideto; and Sugiyama, Tadashi, 4,716,370, Cl. 324-319.000.

Yokohama Rubber Co., Ltd., The: *See*—
Kabe, Kazuyuki; and Morikawa, Tuneo, 4,715,420, Cl. 152-557.000.

Yokomizo, Yoshikazu, to Canon Kabushiki Kaisha. Data decoding apparatus. 4,716,471, Cl. 358-296.000.

Yokono, Hitoshi: *See*—
Noro, Takanobu; Koakutsu, Yasumasa; Takeuchi, Tamio; Yano, Masao; Onoda, Seiichi; Arima, Hideo; Yokono, Hitoshi; and Tanei, Hirayoshi, 4,715,673, Cl. 350-96.200.

Yokota, Fumiki: *See*—
Sekine, Yoshitada; Yokota, Fumiki; and Kubota, Hisashi, 4,715,709, Cl. 356-237.000.

Yokota, Hideo: *See*—
Yamada, Yasuyuki; Fujibayashi, Kazuo; Sato, Yasuhisa; and Yokota, Hideo, 4,715,692, Cl. 350-422.000.

Yokoto, Hiroshi: *See*—
Nishimura, Masayuki; Suzuki, Shuzo; and Yokoto, Hiroshi, 4,715,695, Cl. 350-96.310.

Yokowo Mfg. Co., Ltd.: *See*—
Yanagisawa, Wasuke; and Muramatsu, Kenichi, 4,716,382, Cl. 330-286.000.

Yokoyama, Kiyoshi: *See*—
Horiuchi, Akito; Yokoyama, Kiyoshi; and Yoshida, Makoto, 4,716,133, Cl. 501-97.000.

Yokoyama, Nobuyoshi; and Hayakawa, Tsuneyasu, to Paloma Kogyo Kabushiki Kaisha. Pulse combustion device. 4,715,807, Cl. 431-1.000.

Yokozeki, Akimichi: *See*—
Connon, Helen A.; Gorski, Robert A.; Kenyon, William G.; and Yokozeki, Akimichi, 4,715,900, Cl. 134-31.000.

Yoneda, Hiroshi: *See*—
Koike, Hiroshi; Katada, Hiroshi; and Yoneda, Hiroshi, 4,715,353, Cl. 123-590.000.

Yonezawa, Toshio: *See*—
Minami, Takao; Nagano, Hiroo; Yamanaka, Kazuo; Okada, Yasutaka; Susukida, Hiroshi; Onimura, Kichiro; Yonezawa, Toshio; and Sasaguri, Nobuya, 4,715,909, Cl. 148-410.000.

Yonkers, Edward H.: *See*—
Seiss, Randolph H.; and Yonkers, Edward H., 4,716,197, Cl. 525-75.000.

Yoshida Kogyo K. K.: *See*—
Murasaki, Ryuichi, 4,715,926, Cl. 156-511.000.
Tanikawa, Shinji, 4,715,152, Cl. 52-209.000.

Yoshida, Koichi; and Kawai, Joji, to Mitsubishi Denki Kabushiki Kaisha. Speed detection apparatus. 4,716,535, Cl. 364-565.000.

Yoshida, Koji, to Shin Meiwa Industry Co., Ltd. Terminal crimping machine. 4,715,099, Cl. 29-33.00M.

Yoshida, Makoto: *See*—
Horiuchi, Akito; Yokoyama, Kiyoshi; and Yoshida, Makoto, 4,716,133, Cl. 501-97.000.

Yoshida, Susumu: *See*—
Ogawa, Hiroshi; Miyazaki, Yasuyuki; Yoshida, Susumu; and Sasaki, Shinichi, 4,716,530, Cl. 364-424.000.

Yoshida, Toshihiko; Takiguchi, Haruhisa; Kaneiwa, Shinji; and Matsui, Sadayoshi, to Sharp Kabushiki Kaisha. Distributed feedback semiconductor laser device. 4,716,570, Cl. 372-45.000.

Yoshida, Yasuo: *See*—
Kaminaka, Nobuyuki; and Yoshida, Yasuo, 4,716,484, Cl. 360-125.000.

Yoshihara, Toshiyuki; Hiro, Masaaki; and Watanabe, Katsunori, to Canon Kabushiki Kaisha. Electrophotographic member with silicone graft copolymer in surface layer. 4,716,091, Cl. 430-66.000.

Yoshikawa, Hiroshi: *See*—
Umezawa, Hamao; Takeuchi, Tomio; Kondo, Shinichi; Tanaka, Wataru; Takita, Tomohisa; Nishimura, Yoshio; and Yoshikawa, Hiroshi, 4,716,221, Cl. 536-17.200.

Yoshimoto, Makoto: *See*—
Noda, Seiichi; and Yoshimoto, Makoto, 4,716,385, Cl. 332-9.00R.

Yuasa, Katunori: *See*—
Isobe, Minoru; Koshida, Yoshinori; and Yuasa, Katunori, 4,715,594, Cl. 271-65.000.

Yuki Gosei Kogyo Co., Ltd.: *See*—
Nagai, Yoichiro; Watanabe, Hamao; and Akutsu, Yoshinori, 4,716,240, Cl. 556-430.000.

Zabotto, Arlette; and Contamin, Jean-Claude, to L'Oreal. Cosmetic composition for gentle cleansing, especially for removing eye makeup. 4,715,982, Cl. 252-174.170.

Zaehner, Paul: *See*—
Kaempf, Karl; Zaehner, Paul; and Richter, Wolfgang, 4,715,237, Cl. 73-864.620.

Zafiropoulo, Arthur W.: *See*—
Maher, Joseph A.; Vowles, E. John; Napoli, Joseph D.; Zafiropoulo, Arthur W.; and Miller, Mark W., 4,715,921, Cl. 156-345.000.

Zahnradfabrik Friedrichshafen, AG.: *See*—
Johann, Merz; and Gunther, Seidl, 4,715,793, Cl. 417-300.000.

Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai: *See*—
Umezawa, Hamao; Takeuchi, Tomio; Kondo, Shinichi; Tanaka, Wataru; Takita, Tomohisa; Nishimura, Yoshio; and Yoshikawa, Hiroshi, 4,716,221, Cl. 536-17.200.

Zaidan Hojin Sekitan Gijutsu Kenkyusho: *See*—
Sato, Koji; Kuroda, Hiroshi; Yamada, Ryuji; and Serino, Mamoru, 4,715,657, Cl. 299-1.000.

Zaima, Kazuhito: *See*—
Gion, Hidenori; Yoda, Takumi; Kirita, Yasuzo; Zaima, Kazuhito; and Kurata, Noriyuki, 4,715,849, Cl. 604-52.000.

Zak, Chet, to Post Machinery, Inc. Trailing panel folder. 4,715,846, Cl. 493-10.000.

Zarn, Inc.: *See*—
Lee, Norman C., 4,715,144, Cl. 47-66.000.

Zborovsky, Ilya: *See*—
Sherman, Victor; Zborovsky, Ilya; and Sanchez, William, 4,715,357, Cl. 126-39.00H.

Zdziarski, Mark J.: *See*—
Bores, Leonard F.; and Zdziarski, Mark J., 4,715,649, Cl. 296-218.000.

Zeiler, Hans-Joachim: *See*—
Kruger, Bernd-Wieland; Lockhoff, Oswald; Metzger, Karl G.; Opitz, Hans-Georg; Schaller, Klaus; Stunkel, Klaus G.; and Zeiler, Hans-Joachim, 4,716,152, Cl. 514-25.000.

Zelkowitz, Philip. Electronic instrument housing. 4,716,493, Cl. 361-383.000.

Zenith Electronics Corporation: *See*—
Fendley, James R.; and Greiner, Siegfried M., 4,716,334, Cl. 313-407.000.
Stacy, Carl W.; and Chamberlain, William, 4,716,463, Cl. 358-190.000.

Ziegler, Klaus: *See*—
Busch, Edgar; Schilling, Lothar; and Ziegler, Klaus, 4,715,303, Cl. 112-256.000.

Ziner, Carol: *See*—
Rosenberg, Avraham; and Ziner, Carol, 4,715,282, Cl. 102-227.000.

Ziph, Benjamin: *See*—
Meijer, Roelf J.; and Ziph, Benjamin, 4,715,183, Cl. 60-524.000.

Zsupan, Kalman: *See*—
Timar, Tibor; Zsupan, Kalman; Repasi, Janos; Borsos nee Safranek, Iren; Kiss, Istvan; Fodor, Amdras; and Maroy, Peter, 4,716,238, Cl. 549-408.000.

Zuest, Max; and Zuest, Paul. Denture attachment structure and method. 4,715,817, Cl. 433-181.000.

Zuest, Paul: *See*—
Zuest, Max; and Zuest, Paul, 4,715,817, Cl. 433-181.000.

501 Volvo Car B.V.: *See*—
Mynott, Ralph; and Verbeek, Johan, 4,715,647, Cl. 296-152.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 29TH DAY OF DECEMBER, 1987

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Astberg, Ake, to Svenska Rotor Maskiner Aktiebolag. Screw rotor machine and rotor profile therefor. Re. 32,568, Cl. 418-201.000.

Emert, Anton; Knabel, Walter; and Richert, Manfred, to Marker International Company. Ski brake. Re. 32,567, Cl. 280-605.000.

Knabel, Walter: *See*—
Emert, Anton; Knabel, Walter; and Richert, Manfred, Re. 32,567, Cl. 280-605.000.

Marker International Company: *See*—
Emert, Anton; Knabel, Walter; and Richert, Manfred, Re. 32,567, Cl. 280-605.000.

Patton, Edward E., Jr. Bowler's glove and wrist support. Re. 32,566, Cl. 2-161.00A.

Richert, Manfred: *See*—
Emert, Anton; Knabel, Walter; and Richert, Manfred, Re. 32,567, Cl. 280-605.000.

Svenska Rotor Maskiner Aktiebolag: *See*—
Astberg, Ake, Re. 32,568, Cl. 418-201.000.

LIST OF REEXAMINATION PATENTEES

TO WHOM

CERTIFICATES WERE ISSUED

Buchanan, Robert A., to Lockheed Missiles & Space Co., Inc. Automated radiographic inspection system. B1 4,415,980, 12-29-87, Cl. 378-58.000.

Kostelitz, Michel; and Queille, Philippe, to L'Air Liquide, Societe Anonyme Pour l'Etude et l'Exploitation des Procedes Georges Claude. Method of carburizing workpiece. B1 4,519,853, 12-29-87, Cl. 148-16.500.

L'Air Liquide, Societe Anonyme Pour l'Etude et l'Exploitation des Procedes Georges Claude: *See*—
Kostelitz, Michel; and Queille, Philippe, B1 4,519,853, Cl. 148-16.500.

Lockheed Missiles & Space Co., Inc.: *See*—
Buchanan, Robert A., B1 4,415,980, Cl. 378-58.000.

Ohio State University Research Foundation, The: *See*—
Olsen, Richard G., B1 4,434,157, Cl. 424-89.000.

Olsen, Richard G., to Ohio State University Research Foundation, The. Method of recovering cell antigen and preparation of feline leukemia vaccine therefrom. B1 4,434,157, 12-29-87, Cl. 424-89.000.

Queille, Philippe: *See*—
Kostelitz, Michel; and Queille, Philippe, B1 4,519,853, Cl. 148-16.500.

LIST OF DESIGN PATENTEES

Adler, David T. Combined adjustable positioner and holder for surgical instruments. 293,470, 12-29-87, Cl. D24-27.000.

Aguirre Gili, Ricardo, to Flamagas, S.A. Lighter. 293,486, 12-29-87, Cl. D27-42.000.

Akagawa, Masaki: *See*—
Kobayashi, Osamu; Tanaka, Masanori; Akagawa, Masaki; and Yamagishi, Ryoji, 293,454, Cl. D20-8.000.

Allen, Herbert, to Hallen Company. Corkscrew. 293,414, 12-29-87, Cl. D8-43.000.

Ambiant Systems Limited: *See*—
Stewart, Michael M., 293,400, Cl. D6-487.000.

American Standard Inc.: *See*—
Bengtsson, Herta A., 293,465, Cl. D23-257.000.

American Telephone and Telegraph Company: *See*—
Kowalik, John; Longhitano, Ronald; Miggels, Stephen G.; and Shakespeare, Walter J., 293,441, Cl. D14-60.000.

American Telephone and Telegraph Company, AT&T Information Systems Inc.: *See*—
Britz, David M., 293,440, Cl. D14-60.000.

Anderson, Walter F., Jr.: *See*—
Sutou, Masatoki; Maeda, Yutaka; Anderson, Walter F., Jr.; and Kochevar, James W., 293,390, Cl. D3-35.000.

Asea AB: *See*—
Kaufmann, Herbert; and Forss, Torbjorn, 293,449, Cl. D15-199.000.

AT&T Information Systems Inc.: *See*—
Kowalik, John; Longhitano, Ronald; Miggels, Stephen G.; and Shakespeare, Walter J., 293,441, Cl. D14-60.000.

Atkins, Nancy E. Doll. 293,457, 12-29-87, Cl. D21-173.000.

Attwood Corporation: *See*—
Whitley, Warwick M., II, 293,415, Cl. D8-346.000.

Baitinger, William E.: *See*—
Saunders, G. Thomas; and Baitinger, William E., 293,464, Cl. D23-371.000.

Bastien, Henri, to Fonderies du Lion S.A. Heater. 293,463, 12-29-87, Cl. D23-346.000.

Bellini, Mario: *See*—
Seike, Seishin; and Bellini, Mario, 293,409, Cl. D7-313.000.

Bengtsson, Herta A., to American Standard Inc. Combined water control valve and spout. 293,465, 12-29-87, Cl. D23-257.000.

Berryman, Albert; and Dorm, Dwight A., to Dormco, Inc. Protective body suit. 293,495, 12-29-87, Cl. D29-10.000.

Bird, Elizabeth A., to Cottage Industries (Equestrian) Limited. Buckle and strap assembly for a girth strap. 293,497, 12-29-87, Cl. D30-134.000.

Blackman, Fran: *See*—
Richardson, Deane; Davis, Gregg; Blackman, Fran; and Koloski, Peter, 293,442, Cl. D14-63.000.

Bonnema, Robert W.; Knutson, Robert C.; and Pasquarette, Ralph E., to Honeywell Inc. Controller for an energy management system. 293,421, 12-29-87, Cl. D10-50.000.

Bothun, Eugene L.; and McGuire, Michael C., to Sit-N-Sip, Inc. Combined seat and container. 293,393, 12-29-87, Cl. D6-335.000.

Bower, Allen M.; Butterfield, Eric J.; and Roberts, Robert D., to Emco Wheaton, Inc. Fuel dispensing nozzle. 293,462, 12-29-87, Cl. D23-226.000.

Britz, David M., to American Telephone and Telegraph Company, AT&T Information Systems Inc. Housing for handset base of transaction telephone or similar article. 293,440, 12-29-87, Cl. D14-60.000.

Brooks, Gary W.; and Mastis, Victor, to Grote Manufacturing Company, Inc., The. Vehicle wiring harness connector. 293,433, 12-29-87, Cl. D13-24.000.

Buehl, Chris W.: *See*—
Umanoff, Martin; and Buehl, Chris W., 293,403, Cl. D6-555.000.

Butterfield, Eric J.: *See*—
Bower, Allen M.; Butterfield, Eric J.; and Roberts, Robert D., 293,462, Cl. D23-226.000.
Cabiddu, John. Hair clip. 293,490, 12-29-87, Cl. D28-40.000.
Castro, Eric; Castro, Manuel; and Silva, Frank T. Football game dart board. 293,455, 12-29-87, Cl. D21-6.000.
Castro, Manuel: *See*—
Castro, Eric; Castro, Manuel; and Silva, Frank T., 293,455, Cl. D21-6.000.
Catracchia, Ambrogio. Dental cleaning jet. 293,466, 12-29-87, Cl. D24-15.000.
Centronics Data Computer Corp.: *See*—
Pensavecchia, Frank, 293,445, Cl. D14-111.000.
Champion Spark Plug Company: *See*—
Morgan, Frederick M., 293,446, Cl. D15-9.000.
Chaney, John L. Male erection sustainer. 293,473, 12-29-87, Cl. D24-64.000.
Chang, Ying-Chung. Air separator for an air compressor unit. 293,461, 12-29-87, Cl. D23-207.000.
Chrones, Anthony; and Richardson, Charles C., to Gerber Products Company. Gum massager. 293,472, 12-29-87, Cl. D24-36.000.
Citizen Watch Co., Ltd.: *See*—
Fukumura, Yutaka, 293,418, Cl. D10-32.000.
Sakamaki, Yasuyuki, 293,417, Cl. D10-30.000.
Tanaka, Toshiaki, 293,419, Cl. D10-39.000.
Tanaka, Toshiaki, 293,420, Cl. D10-39.000.
Yoshikawa, Shigeki, 293,424, Cl. D10-125.000.
Coleman Company, Inc., The: *See*—
Hefling, Dennis V., 293,447, Cl. D15-9.000.
Cottage Industries (Equestrian) Limited: *See*—
Bird, Elizabeth A., 293,497, Cl. D30-134.000.
Daly, Lewis J. Pool access apparatus for the disabled. 293,475, 12-29-87, Cl. D25-62.000.
Davis, Gregg: *See*—
Richardson, Deane; Davis, Gregg; Blackman, Fran; and Koloski, Peter, 293,442, Cl. D14-63.000.
Davis, Myron F.; Jordan, Willis Y., III; Kraus, Walter F.; and Syler, Robert L., to International Business Machines Corporation. Personal computer with diskette drive. 293,443, 12-29-87, Cl. D14-100.000.
Dickey, Rosalie J. Meat tenderizer. 293,411, 12-29-87, Cl. D7-382.000.
Don Evans, Inc.: *See*—
Lothe, Arlan D., 293,485, Cl. D27-29.000.
Dorm, Dwight A.: *See*—
Berryman, Albert; and Dorm, Dwight A., 293,495, Cl. D29-10.000.
Dormco, Inc.: *See*—
Berryman, Albert; and Dorm, Dwight A., 293,495, Cl. D29-10.000.
Edwards, Peter; Steinhilber, Budd; and Gilliam, Ken, to Harmony Foods, Inc. Combination food container and scoop. 293,407, 12-29-87, Cl. D7-79.000.
Elkerbout, Marten F., to U.S. Philips Corporation. Physiological unit for monitoring body functions. 293,467, 12-29-87, Cl. D24-17.000.
Emco Wheaton, Inc.: *See*—
Bower, Allen M.; Butterfield, Eric J.; and Roberts, Robert D., 293,462, Cl. D23-226.000.
Emmons, Jeffery E. Curling iron retainer. 293,488, 12-29-87, Cl. D28-38.000.
Famolare, Leo H., to Wolverine World Wide, Inc. Shoe. 293,385, 12-29-87, Cl. D2-287.000.
Fisher Scientific Group: *See*—
Hill, David C.; and Stanley, Donald, 293,468, Cl. D24-17.000.
Flamagas, S.A.: *See*—
Aguirre Gili, Ricardo, 293,486, Cl. D27-42.000.
Fonderies du Lion S.A.: *See*—
Bastien, Henri, 293,463, Cl. D23-346.000.
Forss, Torbjorn: *See*—
Kaufmann, Herbert; and Forss, Torbjorn, 293,449, Cl. D15-199.000.
Franyutti, Eugene; and Franyutti, Juan. Boat. 293,429, 12-29-87, Cl. D12-307.000.
Franyutti, Juan: *See*—
Franyutti, Eugene; and Franyutti, Juan, 293,429, Cl. D12-307.000.
Franzino, Peter L., to Zip Clip, Inc. Spring loaded clip for a hair roller or the like. 293,489, 12-29-87, Cl. D28-40.000.
Fronske, Robert D. Combination floss holder and key chain fob or similar article. 293,491, 12-29-87, Cl. D28-64.000.
Fukumura, Yutaka, to Citizen Watch Co., Ltd. Wrist watch. 293,418, 12-29-87, Cl. D10-32.000.
Gabriel, Edwin Z. Educational electronic experimentation lab-kit. 293,452, 12-29-87, Cl. D17-62.000.
Garmon, Vincent S., to International Business Machines Corp. Personal computer housing. 293,444, 12-29-87, Cl. D14-100.000.
Garr, Ernest J. Wrapping table. 293,493, 12-29-87, Cl. D6-449.000.
Geissler, Udo M., to OSRAM Gesellschaft mit beschrankter Haftung. Flashlight. 293,482, 12-29-87, Cl. D26-49.000.
General Motors Corporation: *See*—
Hughet, Roger E., 293,479, Cl. D26-28.000.
Gentes, James J. Bicycle racing helmet. 293,496, 12-29-87, Cl. D29-12.000.
Gerber Products Company: *See*—
Chrones, Anthony; and Richardson, Charles C., 293,472, Cl. D24-36.000.
Gibbs, Malcolm A., to Twin Star Manufacturing Ltd. Bicycle carrier. 293,427, 12-29-87, Cl. D12-158.000.
Gilliam, Ken: *See*—
Edwards, Peter; Steinhilber, Budd; and Gilliam, Ken, 293,407, Cl. D7-79.000.
Glassman, Fredrick R. Light fixture. 293,483, 12-29-87, Cl. D26-81.000.
Gonzales, Celso S. Spade. 293,412, 12-29-87, Cl. D8-10.000.
Greenblatt, Gordon M. Collapsible syringe holder. 293,469, 12-29-87, Cl. D24-25.000.
Grote Manufacturing Company, Inc., The: *See*—
Brooks, Gary W.; and Mastis, Victor, 293,433, Cl. D13-24.000.
Guild Molders, Inc.: *See*—
Kemmerer, Walter K., 293,494, Cl. D28-82.000.
Kemmerer, Walter W., 293,492, Cl. D28-76.000.
Hallen Company: *See*—
Allen, Herbert, 293,414, Cl. D8-43.000.
Hamilton Sorter Co., Inc.: *See*—
Kwiecinski, Gordon F., 293,398, Cl. D6-430.000.
Hansen, Erik L., to Rosti A/S. Punch ladle. 293,408, 12-29-87, Cl. D7-104.000.
Harmony Foods, Inc.: *See*—
Edwards, Peter; Steinhilber, Budd; and Gilliam, Ken, 293,407, Cl. D7-79.000.
Hefling, Dennis V., to Coleman Company, Inc., The. Air compressor. 293,447, 12-29-87, Cl. D15-9.000.
Hill, David C.; and Stanley, Donald, to Fisher Scientific Group. I.V. infusion pump. 293,468, 12-29-87, Cl. D24-17.000.
Hoffmann, Jochen. Seat. 293,395, 12-29-87, Cl. D6-375.000.
Holcomb, Stephen A. Anatomic cycle seat for relieving pelvic pressure. 293,394, 12-29-87, Cl. D6-354.000.
Honeywell Inc.: *See*—
Bonnema, Robert W.; Knutson, Robert C.; and Pasquarette, Ralph E., 293,421, Cl. D10-50.000.
Hoshino, Naoko; and Suzuki, Yosuke, to Kabushiki Kaisha Toshiba. Operation machine console for telephone information. 293,437, 12-29-87, Cl. D14-52.000.
Hosiden Electronics Co., Ltd.: *See*—
Masuda, Toru, 293,432, Cl. D13-24.000.
Hughet, Roger E., to General Motors Corporation. Auxiliary vehicle brake light. 293,479, 12-29-87, Cl. D26-28.000.
Hunt, Willian G. Adjustable table. 293,397, 12-29-87, Cl. D6-429.000.
Ichikawa, Shinpei, to Timex Corporation. Electrooptic display for a timepiece. 293,425, 12-29-87, Cl. D10-125.000.
Innovative Concepts, Inc.: *See*—
Womack, James A.; and Palmer, Peter J., 293,396, Cl. D6-407.000.
International Business Machines Corporation: *See*—
Davis, Myron F.; Jordan, Willis Y., III; Kraus, Walter F.; and Syler, Robert L., 293,443, Cl. D14-100.000.
Garmon, Vincent S., 293,444, Cl. D14-100.000.
Ishimaru, Makoto, to Kanda Tsushin Kogyo Co., Ltd. Telephone. 293,438, 12-29-87, Cl. D14-58.000.
James River Corporation of Nevada: *See*—
Petterson, Tor, 293,402, Cl. D6-545.000.
Jannard, James H., to Oakley, Inc. Sunglasses. 293,450, 12-29-87, Cl. D16-102.000.
Jermyn, Arthur C. Combined eye cup and eye drop dispenser cap. 293,474, 12-29-87, Cl. D24-66.000.
Joerger, Gerhard E. Lighting fixture. 293,484, 12-29-87, Cl. D26-87.000.
Johanson, Lars-Gunnar, to Watch Out Ltd. AB. Combined dispenser for tape and holder for note pads. 293,453, 12-29-87, Cl. D19-77.000.
Jordan, Willis Y., III: *See*—
Davis, Myron F.; Jordan, Willis Y., III; Kraus, Walter F.; and Syler, Robert L., 293,443, Cl. D14-100.000.
Kabushiki Kaisha Nippon Coinco: *See*—
Kobayashi, Osamu; Tanaka, Masanori; Akagawa, Masaki; and Yamagishi, Ryoji, 293,454, Cl. D20-8.000.
Kabushiki Kaisha Toshiba: *See*—
Hoshino, Naoko; and Suzuki, Yosuke, 293,437, Cl. D14-52.000.
Kanamaru, Masahiko; and Takahashi, Osamu, to Yokohama Rubber Co., Ltd., The. Tire for automobiles. 293,426, 12-29-87, Cl. D12-143.000.
Kanda Tsushin Kogyo Co., Ltd.: *See*—
Ishimaru, Makoto, 293,438, Cl. D14-58.000.
Kaufmann, Herbert; and Forss, Torbjorn, to Asea AB. Industrial robot. 293,449, 12-29-87, Cl. D15-199.000.
Kelley, Brenda C., to Pensa, Inc. Shoe upper. 293,386, 12-29-87, Cl. D2-314.000.
Kemmerer, Walter K., to Guild Molders, Inc. Cosmetic container with multipositional cap. 293,494, 12-29-87, Cl. D28-82.000.
Kemmerer, Walter W., to Guild Molders, Inc. Prismatic cosmetic container. 293,492, 12-29-87, Cl. D28-76.000.
Knapp, Kevin K.: *See*—
Senecal, Marc J.; and Knapp, Kevin K., 293,499, Cl. D32-49.000.
Knutson, Robert C.: *See*—
Bonnema, Robert W.; Knutson, Robert C.; and Pasquarette, Ralph E., 293,421, Cl. D10-50.000.
Kobayashi, Osamu; Tanaka, Masanori; Akagawa, Masaki; and Yamagishi, Ryoji, to Kabushiki Kaisha Nippon Coinco. Regulator of coin selector for automatic vendor. 293,454, 12-29-87, Cl. D20-8.000.
Kochevar, James W.: *See*—
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Koloski, Peter: *See*—
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41.15 4,715,327
41.35 4,715,335
52 B 4,715,328
52 MV 4,715,329
56 BC 4,715,336
90.11 4,715,330
4,715,331
4,715,332
90.31 4,715,333
90.58 4,715,334
169 PA 4,715,337
248 4,715,338
357 4,715,339
406 4,715,340
425 4,715,341
4,715,342
489 4,715,343
4,715,344
512 4,715,345
524 4,715,346
551 4,715,347
571 4,715,348
585 4,715,349
587 4,715,350
4,715,351
589 4,715,352
590 4,715,353
4,715,354

CLASS 124

41 A 4,715,355

CLASS 126

39 H 4,715,356
4,715,357
439 4,715,358

CLASS 128

1.1 4,715,359
4 4,715,360
52 4,715,361
75 4,715,362
80 C 4,715,363
96.1 4,715,364
130 4,715,365
132 D 4,715,366
136 4,715,367
4,715,368
156 4,715,369
204.13 4,715,370
204.26 4,715,371
303 R 4,715,373
303.1 4,715,372
314 4,715,374
328 4,715,375
4,715,376
335 4,715,377
344 4,715,378
360 4,715,379
419 P 4,715,380
419 PT 4,715,381
640 4,715,382
653 4,715,383
706 4,715,384
710 4,715,385
733 4,715,386

CLASS 131

270 4,715,387
309 4,715,388
335 4,715,389
4,715,390

CLASS 134

26 4,715,899
31 4,715,900
57 R 4,715,391
62 4,715,392

CLASS 136

246 4,716,258

CLASS 137

7 4,715,393
38 4,715,394
82 4,715,396
84 4,715,397
171 4,715,398
209 4,715,399
341 4,715,400
355.17 4,715,401
4,715,402
493.2 4,715,403
615 4,715,404
625.17 4,715,406
625.2 4,715,405
625.65 4,715,407

CLASS 138

42 4,715,395

CLASS 139

54 4,715,408
88 4,715,409
434 4,715,410
452 4,715,411

CLASS 141

1 4,715,412
94 4,715,413
302 4,715,414

CLASS 144

136 R 4,715,415

CLASS 148

2 4,715,901
6.3 4,715,902
11.5 A 4,715,903
16.5 B1 4,519,853
102 4,715,904
111 4,715,905
120 4,715,906
144 4,715,907
327 4,715,908
410 4,715,909
414 4,715,910

CLASS 150

52 R 4,715,416
55 4,715,417

CLASS 152

451 4,715,418
527 4,715,419
557 4,715,420

CLASS 156

69 4,715,911

79 4,715,912
85 4,715,913
94 4,715,914
182 4,715,915
245 4,715,916
250 4,715,917
273.1 4,715,918
307.3 4,715,919
344 4,715,920
345 4,715,921
361 4,715,922
380.9 4,715,923
433 4,715,924
470 4,715,925
511 4,715,926
606 4,715,927
630 4,715,928
643 4,715,929

CLASS 160

133 4,715,421

CLASS 162

199 4,715,931

CLASS 164

97 4,715,422
98 4,715,423
264 4,715,424
418 4,715,425
426 4,715,426
456 4,715,427
463 4,715,428

CLASS 165

45 4,715,429
80.3 4,715,430
110 4,715,432
4,715,433
119 4,715,434
120 4,715,435
133 4,715,436
151 4,715,437
185 4,715,438

CLASS 166

68 4,715,439
100 4,715,440
117.5 4,715,441
250 4,715,442
4,715,443
269 4,715,444
377 4,715,445
381 4,715,446

CLASS 169

37 4,715,447
62 4,715,448

CLASS 172

513 4,715,449
701.3 4,715,450

CLASS 174

68.5 4,716,259
102 R 4,716,260

CLASS 175

40 4,715,451
61 4,715,452
73 4,715,453
299 4,715,454
402 4,715,455
423 4,715,456

CLASS 177

1 4,715,457
172 4,715,458

CLASS 180

6.48 4,715,459
7.1 4,715,460
79.1 4,715,461
4,715,462
4,715,463
142 4,715,464
225 4,715,465
233 4,715,466
247 4,715,467
271 4,715,468

CLASS 181

102 4,715,469
106 4,715,470
121 4,715,471
241 4,715,472
286 4,715,473

CLASS 182

194 4,715,474

CLASS 185

39 4,715,475
40 R 4,715,476

CLASS 187

8.47 4,715,477
111 4,715,478

CLASS 188

71.8 4,715,479
74 4,715,480
291 4,715,481

CLASS 191

39 4,716,261

CLASS 192

0.032 4,715,482
4 A 4,715,483
70.25 4,715,484
106.2 4,715,485
107 M 4,715,486

CLASS 193

2 R 4,715,487
35 R 4,715,488

CLASS 194

256 4,715,489

CLASS 198

346.1 4,715,490
856 4,715,491

CLASS 200

5 A 4,716,262
11 R 4,716,263
61.86 4,716,264
144 R 4,716,265
148 R 4,716,266

CLASS 203

43 4,715,932
51 4,715,933

CLASS 204

10 4,715,934
44.6 4,715,935
58 4,715,936
129 4,715,938
177 4,715,937
182.4 4,715,939
192.1 4,715,940
192.36 4,715,941
299 R 4,715,942
4,715,943
426 4,715,944

CLASS 206

0.83 4,715,492
200 4,715,493
213.1 4,715,494
223 4,715,495
229 4,715,496
254 4,715,497
366 4,715,498
373 4,715,499
397 4,715,500

CLASS 208

40 4,715,945
45 4,715,946
68 4,715,947
251 H 4,715,948

CLASS 209

17 4,715,949
20 4,715,950
138 4,715,951
573 4,715,501

CLASS 210

136 4,715,952
321.8 4,715,953
323.1 4,715,954
346 4,715,955
363 4,715,956
497.3 4,715,957
605 4,715,958
637 4,715,959
651 4,715,960
692 4,715,961
708 4,715,962
781 4,715,963
783 4,715,964
800 4,715,965
4,715,966

CLASS 211

26 4,715,502
74 4,715,503

CLASS 215

1 C 4,715,504
100 R 4,715,505
252 4,715,506

CLASS 219

113 4,716,267
118 4,716,268
121 LM 4,716,270
121 PQ 4,716,269
125.11 4,716,271
129 4,716,272
130.01 4,716,273
130.21 4,716,274
201 4,716,275
253 4,716,276
449 4,716,277
521 4,716,278
541 4,716,279

CLASS 220

3.94 4,715,507
7 4,715,508
86 R 4,715,509
90.4 4,715,510
403 4,715,511
465 4,715,512
469 4,715,513

CLASS 221

258 4,715,514

CLASS 222

143 4,715,515
153 4,715,516
181 4,715,517
257 4,715,518

CLASS 225

48 4,715,519

CLASS 227

19 4,715,520
67 4,715,521
156 4,715,522

CLASS 228

2 4,715,523
165 4,715,524
194 4,715,525
219 4,715,526

CLASS 229

1.5 B 4,715,527
2.5 R 4,715,529
73 4,715,530
4,715,531
123.1 4,715,528

CLASS 235

98 C 4,716,280
383 4,716,281

CLASS 236

49 4,715,532

CLASS 238

283 4,715,533
349 4,715,534

CLASS 239

1 4,715,535
54 4,715,536
119 4,715,537
248 4,715,538
263 4,715,539
533.3 4,715,540
533.4 4,715,541
533.9 4,715,542
542 4,715,543

CLASS 241

57 4,715,544
169.1 4,715,545
171 4,715,546
176 4,715,547

CLASS 242

18 R 4,715,548
25 R 4,715,549
39 4,715,550
46.4 4,715,551
56 A 4,715,552
68.4 4,715,553
84.2 R 4,715,554
84.5 R 4,715,555
118.6 4,715,556
129 4,715,557
199 4,715,558

CLASS 244

1 N 4,715,559
129.1 4,715,561
137.2 4,715,562
152 4,715,563
153 R 4,715,564
158 R 4,715,565
159 4,715,566
177 R 4,715,560
213 4,715,567

CLASS 248

1 4,715,568
27.1 4,715,569
49 4,715,570
68.1 4,715,571
101 4,715,572
129 4,715,573
297.1 4,715,574
309.1 4,715,575

CLASS 249

60 4,715,576
107 4,715,577

CLASS 250

201 4,716,282
4,716,283
4,716,284
205 4,716,285
214 R 4,716,286
227 4,716,287
4,716,288
231 SE 4,716,289
4,716,290
237 G 4,716,292
318 4,716,291
340 4,716,293
353 4,716,294
423 P 4,716,295
504 H 4,716,296
551 4,716,297
561 4,716,298
571 4,716,299
578 4,716,300

CLASS 251

25 4,715,578
121 4,715,579
229 4,715,580
308 4,715,581

CLASS 252

8.51 4,715,971
8.551 4,715,967
8.6 4,715,968
8.7 4,715,969
8.8 4,715,970
25 4,715,972
40.5 4,715,973
46.4 4,715,974
50 4,715,975
62.2 4,715,976
62.54 4,715,977
70 4,715,978
91 4,715,979
106 4,715,980
174.11 4,715,981
174.17 4,715,982
186.35 4,715,983
299.61 4,715,984
305 4,715,985
315.2 4,715,986
315.5 4,715,987
408.1 4,715,988
512 4,715,989
551 4,715,990
555 4,715,991
628 4,715,992

CLASS 254

134.3 CL 4,715,582
283 4,715,583

CLASS 260

380 4,715,993
502.5 E 4,715,994
511 4,715,995

CLASS 261

114.2 4,715,996
142 4,715,997
4,715,998

CLASS 264

1.1 4,715,999
83 4,716,000
145 4,716,001
182 4,716,002
302 4,716,003

CLASS 266

155 4,715,584
273 4,715,585
275 4,715,586

CLASS 267

103 4,715,587
122 4,715,588
148 4,715,589

CLASS 269

76 4,715,590
322 4,715,591
328 4,715,592

CLASS 271

10 4,715,593
65 4,715,594
110 4,715,595
116 4,715,596
122 4,715,597

CLASS 272

3 4,715,598

CLASS 273

1.5 R 4,715,600
15 R 4,715,599
77 A 4,715,601
86 R 4,715,602
90 4,715,603
143 R 4,715,604
156 4,715,605
194 B 4,715,606
218 4,715,607
248 4,715,608

CLASS 277

207 R 4,715,609

CLASS 280

490 R 4,715,610
504 4,715,611
605 Re.32,567
609 4,715,612
701 4,715,614
4,715,615
707 4,715,616
731 4,715,617
801 4,715,618

CLASS 281

19 R 4,715,619

CLASS 282

9 R 4,715,620

CLASS 283

36 4,715,621
71 4,715,622
91 4,715,623

CLASS 285

55 4,715,624
145 4,715,625
230 4,715,626

CLASS 292

19 4,715,628
256 4,715,629

CLASS 293

120 4,715,630

CLASS 294

2 4,715,631
19.1 4,715,632
31.2 4,715,633
50.5 4,715,634
68.1 4,715,635
86.4 4,715,636
4,715,637
88 4,715,638
99.2 4,715,639
106 4,715,640
119.4 4,715,641

CLASS 296

1 R 4,715,642
97 A 4,715,643
97 H 4,715,644
120 R 4,715,645
136 4,715,646
152 4,715,647
198 4,715,648
218 4,715,649

CLASS 297

28 4,715,650
219 4,715,651
252 4,715,652
284 4,715,653
329 4,715,654
362 4,715,655
4,715,656

CLASS 299

1 4,715,657
34 4,715,658
43 4,715,659

CLASS 301

13 R 4,715,660

CLASS 303

10 4,715,661
109 4,715,662
110 4,715,663
111 4,715,664
4,715,665
116 4,715,666
119 4,715,667

CLASS 305

34 4,715,668

CLASS 307

115 4,716,301
200 B 4,716,302
264 4,716,303
270 4,716,304
296 R 4,716,305
4,716,306
297 4,716,307
303 4,716,308
442 4,716,309
446 4,716,310
448 4,716,311
475 4,716,312
4,716,313
477 4,716,314
491 4,716,315
492 4,716,316
520 4,716,317
4,716,318
4,716,319
530 4,716,320
540 4,716,321
592 4,716,322
594 4,716,323

CLASS 310

11 4,716,324
41 4,716,325
89 4,716,326
90 4,716,327
178 4,716,328
183 4,716,329
233 4,716,330
330 4,716,331
368 4,716,332

CLASS 312

12 4,715,669

CLASS 313

402 4,716,333
407 4,716,334
486 4,716,335
4,716,336
487 4,716,337
619 4,716,338

CLASS 315

15 4,716,339
111.41 4,716,340
169.4 4,716,341
219 4,716,342
307 4,716,343
312 4,716,344
392 4,716,345

CLASS 318

38 4,716,346
460 4,716,347
479 4,716,348
562 4,716,349
568 4,716,350
600 4,716,351

CLASS 320

2 4,716,352
21 4,716,353
39 4,716,354
64 4,716,355

CLASS 323

263 4,716,357
312 4,716,356
316 4,716,358
349 4,716,359

CLASS 324

58.5 A 4,716,360
60 R 4,716,361
77 B 4,716,362
77 R 4,716,363
127 4,716,364
158 P 4,716,365
207 4,716,366
309 4,716,367
4,716,368
4,716,369
319 4,716,370
457 4,716,371

CLASS 328

146 4,716,372
165 4,716,373
169 4,716,374

CLASS 329

50 4,716,375
107 4,716,376
117 4,716,377

CLASS 330

108 4,716,378
252 4,716,379
253 4,716,380
256 4,716,381
286 4,716,382

CLASS 331

117 FE 4,716,383

CLASS 332

7.51 4,716,384
9 R 4,716,385

CLASS 333

26 4,716,386
4,716,387
81 A 4,716,389
173 4,716,388
202 4,716,390

206 4,716,391

CLASS 335

189 4,716,392
261 4,716,393

CLASS 336

192 4,716,394

CLASS 338

149 4,716,395
226 4,716,396

CLASS 340

347 AD 4,716,397
347 DA 4,716,398
365 P 4,716,399
568 4,716,401
572 4,716,400
693 4,716,402
702 4,716,403
723 4,716,404
4,716,405
753 4,716,412
814 4,716,406
825.04 4,716,407
825.22 4,716,409
825.5 4,716,408
825.520 4,716,410
870.17 4,716,411
933 4,716,413

CLASS 342

179 4,716,414

CLASS 343

708 4,716,417
771 4,716,415
915 4,716,416

CLASS 346

1.1 4,716,418
76 PH 4,716,419
139 R 4,716,420
140 R 4,716,421
4,716,422
4,716,423

CLASS 350

3.69 4,715,670
6.8 4,715,699
96.10 4,715,671
96.12 4,715,672
96.20 4,715,673
4,715,675
96.21 4,715,674
96.23 4,715,676
4,715,677
4,715,678
96.31 4,715,695
96.33 4,715,679
96.34 4,715,680
99 4,715,681
253 4,715,682
331 R 4,715,683
4,715,684
332 4,715,685
339 R 4,715,686
345 4,715,687
350 S 4,715,688
354 4,715,689
357 4,715,690
4,715,691
422 4,715,692
4,715,693
486 4,715,694
500 4,715,696
502 4,715,697
588 4,715,698
618 4,715,700
625 4,715,701

CLASS 351

44 4,715,702
205 4,715,703
207 4,715,704

CLASS 353

120 4,715,705

CLASS 354

76 4,716,425
4,716,426
159 4,716,427
173.11 4,716,428
403 4,716,430
407 4,716,431
408 4,716,434
409 4,716,429
446 4,716,432
468 4,716,433

CLASS 355

3 CH 4,716,436
3 DD 4,716,437
3 FU 4,716,435
6 4,716,438
7 4,716,439

14 SH 4,716,440
30 4,716,441
67 4,716,442
84 4,716,443

CLASS 356

5 4,715,706
05 4,716,444
28.5 4,715,707
72 4,715,708
237 4,715,709
246 4,715,710
4,715,711
328 4,715,712
350 4,715,713
375 4,715,714
402 4,715,715
421 4,715,716
429 4,715,717
446 4,715,718

CLASS 357

16 4,716,445
23.14 4,716,446
24 4,716,447
25 4,716,448
30 4,716,449
42 4,716,450
4,716,451
68 4,716,452

CLASS 358

96 4,716,547
149 4,716,548
203 4,716,549
207 4,716,550
222 4,716,551
4,716,552

CLASS 366

2 4,715,719
25 4,715,720
132 4,715,721
4,715,722
142 4,715,723
157 4,715,724

CLASS 367

15 4,716,553
20 4,716,554
35 4,716,555
168 4,716,556

CLASS 368

157 4,715,725

CLASS 369

32 4,716,557
33 4,716,558
112 4,716,559
275 4,716,560

CLASS 370

55 4,716,561
110.1 4,716,562
110.4 4,716,563

CLASS 371

27 4,716,564
31 4,716,565
37 4,716,566
40 4,716,567

CLASS 372

36 4,716,568
38 4,716,569
45 4,716,570
48 4,716,571

CLASS 373

88 4,716,572

CLASS 374

102 4,715,726
122 4,715,727

CLASS 375

1 4,716,573
4,716,574
3 4,716,575
5 4,716,576
15 4,716,577
20 4,716,578
81 4,716,579

CLASS 376

203 4,716,004
205 4,716,005
209 4,716,006
4,716,007
237 4,716,008
242 4,716,009
260 4,716,010
281 4,716,011
352 4,716,012
353 4,716,013
371 4,716,014
445 4,716,015
446 4,716,016
4,716,017

186 4,716,519
4,716,520
200 4,716,521
4,716,522
4,716,523
4,716,524
4,716,525
4,716,526
4,716,527
300 4,716,528
410 4,716,529
424 4,716,530
431.02 4,716,531
477 4,716,532
518 4,716,533
559 4,716,534
565 4,716,535
571 4,716,536
724 4,716,537
754 4,716,538
4,716,539
807 4,716,540
900 4,716,541
4,716,542
4,716,543
4,716,544
4,716,545
4,716,546

CLASS 365

44 4,715,729
52 4,715,730
100 4,715,731
320 4,715,732
445 4,715,733

CLASS 400

56 4,715,734
82 4,715,735
484 4,715,736
569 4,715,737

CLASS 403

24 4,715,738
30 4,715,739
313 4,715,740
389 4,715,741

CLASS 404

6 4,715,742
9 4,715,743

CLASS 405

26 4,715,744
262 4,715,745
264 4,715,746
303 4,715,747

CLASS 406

11 4,715,748
14 4,715,749
111 4,715,750

CLASS 409

139 4,715,751
232 4,715,752
234 4,715,753

CLASS 410

107 4,715,754

CLASS 411

39 4,715,755
369 4,715,756
411 4,715,757

CLASS 412

8 4,715,758
33 4,715,759

CLASS 414

10 4,715,760
22 4,715,761
126 4,715,762
216 4,715,763
217 4,715,764
276 4,715,765
392 4,715,766
408 4,715,767
535 4,715,768
571 4,715,769
680 4,715,770
688 4,715,771
730 4,715,772
4,715,773
751 4,715,774
758 4,715,775

CLASS 415

2 R 4,715,776
53 T 4,715,777
104 4,715,778
144 4,715,779
170 A 4,715,780
219 C 4,715,781

CLASS 416

32 4,715,782

451 4,716,018

CLASS 377

62 4,716,580

CLASS 378

58 B1 4,415,980
198 4,716,581

CLASS 379

28 4,716,582
88 4,716,583
176 4,716,584
202 4,716,585

CLASS 380

3 4,716,586
10 4,716,587
29 4,716,588

CLASS 381

3 4,716,589
15 4,716,590
40 4,716,592
42 4,716,593
51 4,716,591

CLASS 383

9 4,715,728

CLASS 384

44 4,715,729
52 4,715,730
100 4,715,731
320 4,715,732
445 4,715,733

CLASS 400

56 4,715,734
82 4,715,735
484 4,715,736
569 4,715,737

CLASS 403

24 4,715,738
30 4,715,739
313 4,715,740
389 4,715,741

CLASS 404

6 4,715,742
9 4,715,743

CLASS 405

26 4,715,744
262 4,715,745
264 4,715,746
303 4,715,747

CLASS 406

11 4,715,748
14 4,715,749
111 4,715,750

CLASS 409

139 4,715,751
232 4,715,752
234 4,715,753

CLASS 410

107 4,715,754

CLASS 411

39 4,715,755
369 4,715,756
411 4,715,757

CLASS 412

8 4,715,758
33 4,715,759

CLASS 414

10 4,715,760
22 4,715,761
126 4,715,762
216 4,715,763
217 4,715,764
276 4,715,765
392 4,715,766
408 4,715,767
535 4,715,768
571 4,715,769
680 4,715,770
688 4,715,771
730 4,715,772
4,715,773
751 4,715,774
758 4,715,775

CLASS 415

2 R 4,715,776
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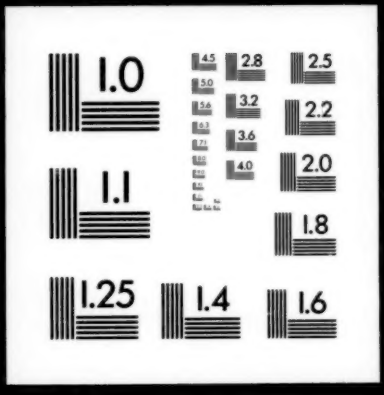
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